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=> file reg
FILE 'REGISTRY' ENTERED AT 16:51:17 ON 12 AUG 2004
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=> d his nofile l1-

     FILE 'REGISTRY' ENTERED AT 14:50:04 ON 12 AUG 2004
L1            1 SEA ABB=ON  PLU=ON  ZINC OXIDE/CN
L2            1 SEA ABB=ON  PLU=ON  PALLADIUM/CN
L3            5 SEA ABB=ON  PLU=ON  (1314-13-2 AND 7440-05-3)/CRN
L4          103 SEA ABB=ON  PLU=ON  (ZN(L)O(L)PD)/ELS
L5            7 SEA ABB=ON  PLU=ON  (L3 OR L4) AND 3/ELC.SUB
L6          111 SEA ABB=ON  PLU=ON  (ZN(L)O)/ELS AND 2/ELC.SUB

     FILE 'CAPLUS' ENTERED AT 15:02:46 ON 12 AUG 2004
L7            1 SEA ABB=ON  PLU=ON  L3/CAT OR L5/CAT
L8         1409 SEA ABB=ON  PLU=ON  L6 AND L2
L9          690 SEA ABB=ON  PLU=ON  L8 AND CAT/RL
L10         691 SEA ABB=ON  PLU=ON  L7 OR L9
L11       53782 SEA ABB=ON  PLU=ON  PORE(2A)(SIZE OR VOLUME OR MICRON OR
MU)
L12          10 SEA ABB=ON  PLU=ON  L10 AND L11

     FILE 'REGISTRY' ENTERED AT 15:06:30 ON 12 AUG 2004
L13           1 SEA ABB=ON  PLU=ON  RUTHENIUM/CN
L14           1 SEA ABB=ON  PLU=ON  CERIUM/CN
L15           1 SEA ABB=ON  PLU=ON  ZIRCONIA/CN
L16           1 SEA ABB=ON  PLU=ON  ALUMINA/CN
L17           4 SEA ABB=ON  PLU=ON  (7440-05-3 OR 7440-18-8)/CRN AND
7440-45-1/
                CRN AND (1314-23-4 OR 1344-28-1)/CRN

     FILE 'REGISTRY' ENTERED AT 15:17:18 ON 12 AUG 2004
L18           3 SEA ABB=ON  PLU=ON  ((PD OR RU)(L)CE(L)(ZR OR AL)(L)O)/ELS
AND
                4/ELC.SUB
L19           7 SEA ABB=ON  PLU=ON  L17 OR L18

     FILE 'CAPLUS' ENTERED AT 15:20:59 ON 12 AUG 2004
L20           2 SEA ABB=ON  PLU=ON  L19/CAT
L21         462 SEA ABB=ON  PLU=ON  (L13 OR L2) AND L14 AND (L15 OR L16)
AND
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                        CAT/RL
L22            377 SEA ABB=ON  PLU=ON  CERIUM(2A)PROMOT?
L23             14 SEA ABB=ON  PLU=ON  L21 AND L22
L24             84 SEA ABB=ON  PLU=ON  (L13 OR L2 OR RU OR PD OR RUTHENIUM OR
                   PALLADIUM)(L)(CERIUM OR CE OR L14)(L)(L15 OR ZRO? OR
ZIRCONIA
                   OR AL2O3 OR ALUMINA OR L16)(L)PROMOT? AND CAT/RL
L25             11 SEA ABB=ON  PLU=ON  (PALLADIUM-RUTHENIUM)(L)(ZIRCONIA OR
                   ALUMINA OR ZRO? OR AL2O3) AND CAT/RL
L26            116 SEA ABB=ON  PLU=ON  L12 OR L20 OR L24 OR L23 OR L25

     FILE 'CAPLUS' ENTERED AT 15:42:07 ON 12 AUG 2004
L27           8937 SEA ABB=ON  PLU=ON  (STEAM OR WATER(2A)GAS OR
WATER(2A)VAPOR)(2
                   A)REFORMING OR HYDROFORMING
L28             53 SEA ABB=ON  PLU=ON  (METHYL OR ETHYL OR PROPYL OR
ISOPROPYL OR
                   BUTYL OR ISOBUTYL OR T-BUTYL)(L)(ALCOHOL OR
ALC)(L)REFORMING
                   OR METHAFORMING
L29           2377 SEA ABB=ON  PLU=ON  (METHANOL OR ETHANOL OR PROPANOL OR
                   ISOPROPANOL OR BUTANOL OR ISOBUTANOL OR T-BUTANOL OR MEOH
OR
                   ETOH OR PROH OR I-PROH OR BUOH OR I-BUOH OR
T-BUOH)(L)(REFORMIN
                   G)
L30              6 SEA ABB=ON  PLU=ON  (L27 OR L28 OR L29) AND L26
L31         243624 SEA ABB=ON  PLU=ON  STEAM? OR (WATER OR H2O)(2A)GAS## OR
                   WATERGAS##
L32          42109 SEA ABB=ON  PLU=ON  REFORM?

     FILE 'REGISTRY' ENTERED AT 16:37:36 ON 12 AUG 2004
                   E METHANOL/CN
L35              1 SEA ABB=ON  PLU=ON  METHANOL/CN
                   E ETHANOL/CN
L36              1 SEA ABB=ON  PLU=ON  ETHANOL/CN
                   E N-PROPANOL/CN
L37              1 SEA ABB=ON  PLU=ON  N-PROPANOL/CN
                   E ISOPROPANOL/CN
L38              1 SEA ABB=ON  PLU=ON  ISOPROPANOL/CN
                   E N-BUTANOL/CN
L39              1 SEA ABB=ON  PLU=ON  N-BUTANOL/CN
                   E ISOBUTANOL/CN
L40              1 SEA ABB=ON  PLU=ON  ISOBUTANOL/CN
                   E TERT-BUTANOL/CN
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L41            1 SEA ABB=ON  PLU=ON  TERT-BUTANOL/CN
                 E SEC-BUTANOL/CN
L42            1 SEA ABB=ON  PLU=ON  SEC-BUTANOL/CN
L43            8 SEA ABB=ON  PLU=ON  (L35 OR L36 OR L37 OR L38 OR L39 OR
L40 OR
                 L41 OR L42)

     FILE 'CAPLUS' ENTERED AT 16:44:53 ON 12 AUG 2004
L44      1025781 SEA ABB=ON  PLU=ON  L43 OR (METHYL OR ETHYL OR PROPYL OR
BUTYL
                 OR ISOPROPYL OR ISOBUTYL)(2A)(ALC# OR ALCOHOL#) OR MEOH OR
                 ETOH OR PROH OR NPROH OR IPROH OR BUOH OR IBUOH OR SBUOH
OR
                 TBUOH OR METHANOL# OR ETHANOL# OR PROPANOL# OR
ISOPROPANOL# OR
                 BUTANOL# OR ISOBUTANOL#
L45       751969 SEA ABB=ON  PLU=ON  ALC# OR ALCOHOL#
L46         6924 SEA ABB=ON  PLU=ON  FISCHER#(2A)TROPSCH#
L47            4 SEA ABB=ON  PLU=ON  L26 AND L31
L48           12 SEA ABB=ON  PLU=ON  L26 AND L32
L49            4 SEA ABB=ON  PLU=ON  L47 AND L48
L50           12 SEA ABB=ON  PLU=ON  L26 AND L44
L51            5 SEA ABB=ON  PLU=ON  L26 AND L45
L52            6 SEA ABB=ON  PLU=ON  L26 AND L46
L53           22 SEA ABB=ON  PLU=ON  (L47 OR L48 OR L50 OR L51 OR L52) NOT
L30
L54           88 SEA ABB=ON  PLU=ON  L26 NOT (L30 OR L53)


=> file caplus
FILE 'CAPLUS' ENTERED AT 16:52:23 ON 12 AUG 2004
USE IS SUBJECT TO THE TERMS OF YOUR STN CUSTOMER AGREEMENT.
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=> d l53 1-22 cbib abs hitstr hitind
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L53 ANSWER 1 OF 22 CAPLUS COPYRIGHT 2004 ACS on STN
2003:546508 Document No. 139:294208 Designing New High Oxygen Mobility Supports to Improve the Stability of Ru Catalysts Under Dry **Reforming** of Methane. Menad, S.; Ferreira-Aparicio, P.; Cherifi, O.; Guerrero-Ruiz, A.; Rodriguez-Ramos, I. (Instituto de Catalisis y

Petroleoquimica CSIC, Madrid, 28049, Spain). Catalysis Letters, 89(1-2), 63-67 (English) 2003. CODEN: CALEER. ISSN: 1011-372X. Publisher: Kluwer Academic/Plenum Publishers.

AB The application of a novel Ce0.5Zr0.5O2 mixed oxide prepd. by the microemulsion method as a support of **Ru** catalysts for the **reforming** of CH4 with CO2 originates a high-activity catalytic system with excellent stability under reaction conditions. The support characteristics clearly det. the catalytic stability of **Ru** catalysts under CH4 + CO2 reaction conditions. The introduction of **cerium** as a **promoter** in the **ZrO2** structure is shown to improve the catalyst performance by increasing the oxygen mobility in the support and consequently reducing deactivation by carbon deposition during reaction.

CC 51-11 (Fossil Fuels, Derivatives, and Related Products)

ST methane carbon dioxide **reforming** catalyst support synthesis gas; dry **reforming** ruthenium catalyst support cerium zirconium oxide

IT **Reforming** catalysts
Synthesis gas manufacturing
(stability of Ru catalysts under dry **reforming** of methane)

IT 7440-44-0, Carbon, formation (nonpreparative)
RL: FMU (Formation, unclassified); FORM (Formation, nonpreparative)
(catalyst coke deposition, control of; stability of Ru catalysts under dry **reforming** of methane)

IT 53169-24-7, Cerium zirconium oxide (Ce0.5Zr0.5O2)
RL: **CAT (Catalyst use)**; USES (Uses)
(catalyst supports; stability of Ru catalysts under dry **reforming** of methane)

IT 74-82-8, Methane, reactions
RL: RCT (Reactant); RACT (Reactant or reagent)
(stability of Ru catalysts under dry **reforming** of)

IT 7440-18-8, Ruthenium, uses
RL: **CAT (Catalyst use)**; USES (Uses)
(stability of Ru catalysts under dry **reforming** of methane)

IT 124-38-9, Carbon dioxide, reactions
RL: RCT (Reactant); RACT (Reactant or reagent)
(stability of Ru catalysts under dry **reforming** of methane)

L53 ANSWER 2 OF 22 CAPLUS COPYRIGHT 2004 ACS on STN
2003:545775 Document No. 139:103488 Method and apparatus for producing high-molecular-weight liquid hydrocarbons from air and methane and/or

natural gas. Harford, Steven Thomas; Borsa, Alessandro Giorgio; Vanderborgh, Nicholas Ernest (Blue Star Sustainable Technologies Corporation, USA). U.S. US 6593377 B1 20030715, 6 pp. (English).
CODEN:
USXXAM. APPLICATION: US 2002-83176 20020226.
AB A method is described for converting a mixt. of a low-mol.-wt. hydrocarbon gas and air into a C5+ liq. hydrocarbon having direct utility as a compression-ignition fuel comprises: providing a packed-bed catalytic partial oxidn. reactor; providing a first catalyst in the catalytic partial oxidn. reactor selected from a platinum-group catalyst, a **promoted** platinum-group catalyst, a rhodium catalyst, and a platinum-**promoted** rhodium catalyst; providing a mixt. of low-mol.-wt. hydrocarbon gas and air to an input of the catalytic partial oxidn. reactor; and providing a first packed-bed **Fischer-Tropsch** reactor. The process further comprises: providing a second supported catalyst in a first **Fischer-Tropsch** reactor consisting of 3-60 parts cobalt and 0.1-100 parts of at least one metal selected from **cerium**, lanthanum, platinum, and **ruthenium** per 100 parts of a support selected from silica, **alumina**, and combinations of silica and **alumina**; providing an output of the catalytic partial oxidn. reactor to an input of the first **Fischer-Tropsch** reactor; and sepg. an output of said first **Fischer-Tropsch** reactor into a first liq.-phase compression-ignition fuel output and a first gas-phase output in the absence of recycling of any portion of the output of the first **Fischer-Tropsch** reactor to the catalytic partial oxidn. reactor. A process flow diagram is presented.
IC ICM C07C027-00
NCL 518706000; 518702000; 518703000; 518715000
CC 51-9 (Fossil Fuels, Derivatives, and Related Products)
Section cross-reference(s): 23, 45, 48
ST liq fuel manuf natural gas conversion **Fischer Tropsch** reaction; methane oxidn **Fischer Tropsch** reaction manuf liq hydrocarbon fuel
IT Platinum-group metals
RL: **CAT (Catalyst use)**; EPR (Engineering process); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)
(catalysts; method and app. for producing high-mol.-wt. liq. hydrocarbons from air and methane and/or natural gas)

IT **Fischer-Tropsch** catalysts
Fischer-Tropsch reaction
Oxidation catalysts
(method and app. for producing high-mol.-wt. liq. hydrocarbons from air
and methane and/or natural gas using)
IT 1344-28-1, Alumina, uses 7631-86-9, Silica, uses 159995-97-8, Aluminum
silicon oxide
RL: **CAT (Catalyst use)**; EPR (Engineering process); PEP
(Physical, engineering or chemical process); PROC (Process); USES (Uses)
(catalyst support; method and app. for producing high-mol.-wt. liq.
hydrocarbons from air and methane and/or natural gas using)
IT 7439-91-0, Lanthanum, uses 7440-06-4, Platinum, uses 7440-16-6,
Rhodium, uses 7440-18-8, Ruthenium, uses 7440-45-1, Cerium, uses
7440-48-4, Cobalt, uses
RL: **CAT (Catalyst use)**; EPR (Engineering process); PEP
(Physical, engineering or chemical process); PROC (Process); USES (Uses)
(catalysts; method and app. for producing high-mol.-wt. liq.
hydrocarbons from air and methane and/or natural gas)

L53 ANSWER 3 OF 22 CAPLUS COPYRIGHT 2004 ACS on STN
2003:236976 Document No. 138:403879 An integrated process of a two-stage
fixed bed syngas production and F-T synthesis for GTL in remote gas field.
Dai, Xiaoping; Yu, Changchun; Li, Qiang; Zhang, Changbin; Jiang, Qiying;
Shen, Shikong (The Key Laboratory of Catalysis, CNPC, University of
Petroleum, Beijing, 102249, Peop. Rep. China). Chinese Journal of
Chemical Engineering, 11(1), 85-89 (English) 2003. CODEN: CJCEEB. ISSN:
1004-9541. Publisher: Chemical Industry Press.
AB A novel process for catalytic oxidn. of methane to synthesis gas (syngas),
which consists of two consecutive fixed-bed reactors with air introduced
into the reactors, integrated **Fischer-Tropsch**
synthesis, was studied. At the same time, a catalytic combustion technol.
was studied for using the F-T offgas to generate heat or power energy.
The two-stage fixed reactor process keep away from explosive limits of
CH_4/O_2 mixt. The integrated process is fitted to produce diesel oil and

lubricating oil in remote gas field.
IT **7440-05-3**, Palladium, uses
RL: **CAT (Catalyst use)**; USES (Uses)
(loaded with platinum on γ-alumina, methane oxidn. catalyst; integrated process of two-stage fixed bed syngas prodn. and F-T synthesis for GTL in remote gas field)
RN 7440-05-3 CAPLUS
CN Palladium (8CI, 9CI) (CA INDEX NAME)

Pd

IT **7440-45-1**, **Cerium**, uses
RL: **CAT (Catalyst use)**; USES (Uses)
(silica **promoted** with Ce/Co; integrated process of two-stage fixed bed syngas prodn. and F-T synthesis for GTL in remote gas
field)
RN 7440-45-1 CAPLUS
CN Cerium (8CI, 9CI) (CA INDEX NAME)

Ce

IT **1344-28-1**, Alumina, uses
RL: **CAT (Catalyst use)**; USES (Uses)
(γ-, Pd-Pt loaded, support, methane oxidn. catalyst; integrated process of two-stage fixed bed syngas prodn. and F-T synthesis for
GTL
in remote gas field)
RN 1344-28-1 CAPLUS
CN Aluminum oxide (Al2O3) (8CI, 9CI) (CA INDEX NAME)

*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***
CC 51-11 (Fossil Fuels, Derivatives, and Related Products)
Section cross-reference(s): 67
ST integrated stage syngas **Fischer Tropsch** fuel natural gas oxidn; fixed bed FT catalyst diesel lubricating oil perovskite lanthanum; lanthanum promoted catalysis combustion partial oxidn **Fischer Tropsch** hydrogenation
IT Diesel fuel
Fischer-Tropsch reaction
Lubricating oils
Perovskite-type crystals

Henderson

Synthesis gas
(integrated process of two-stage fixed bed syngas prodn. and F-T synthesis for GTL in remote gas field)

IT 7631-86-9, Silica, uses
RL: **CAT (Catalyst use)**; USES (Uses)
(Ce/Co promoted; integrated process of two-stage fixed bed syngas prodn. and F-T synthesis for GTL in remote gas field)

IT 173558-62-8, Aluminum magnesium oxide (Al2MgO3)
RL: **CAT (Catalyst use)**; USES (Uses)
(La2O3-promoted; integrated process of two-stage fixed bed syngas prodn. and F-T synthesis for GTL in remote gas field)

IT 7440-02-0, Nickel, uses
RL: **CAT (Catalyst use)**; USES (Uses)
(doped La2O3-promoted MgAl2O3, FT catalyst; integrated process of two-stage fixed bed syngas prodn. and F-T synthesis for GTL in remote
gas field)

IT 7440-06-4, Platinum, uses
RL: **CAT (Catalyst use)**; USES (Uses)
(loaded with palladium on γ-alumina, methane oxidn. catalyst; integrated process of two-stage fixed bed syngas prodn. and F-T synthesis for GTL in remote gas field)

IT **7440-05-3**, Palladium, uses
RL: **CAT (Catalyst use)**; USES (Uses)
(loaded with platinum on γ-alumina, methane oxidn. catalyst; integrated process of two-stage fixed bed syngas prodn. and F-T synthesis for GTL in remote gas field)

IT 112510-19-7, Calcium lanthanum manganese oxide (Ca0.3La0.7MnO3)
529487-74-9, Calcium iron lanthanum manganese oxide (Ca0.3Fe0.3La0.7Mn0.7O3)
RL: **CAT (Catalyst use)**; USES (Uses)
(methane oxidn. catalyst; integrated process of two-stage fixed bed syngas prodn. and F-T synthesis for GTL in remote gas field)

IT 1312-81-8, Lanthanum oxide (La2O3)
RL: **CAT (Catalyst use)**; USES (Uses)
(promoted MgAl2O3; integrated process of two-stage fixed bed syngas prodn. and F-T synthesis for GTL in remote gas field)

IT **7440-45-1, Cerium**, uses 7440-48-4, Cobalt, uses
RL: **CAT (Catalyst use)**; USES (Uses)
(silica **promoted** with Ce/Co; integrated process of two-stage fixed bed syngas prodn. and F-T synthesis for GTL in remote gas
field)

IT **1344-28-1**, Alumina, uses
RL: **CAT (Catalyst use)**; USES (Uses)
(γ-, Pd-Pt loaded, support, methane oxidn. catalyst; integrated

process of two-stage fixed bed syngas prodn. and F-T synthesis for
GTL
in remote gas field)

L53 ANSWER 4 OF 22 CAPLUS COPYRIGHT 2004 ACS on STN
2003:170878 Document No. 138:371364 Electron-microscopy study
multicomponent
Ce/Θ-Al2O3 oxide methane combustion catalysts. Komashko, L. V.;
Zheksenbaeva, Z. T.; Popova, N. M.; Dosumov, K. D. (Inst. Org.
Kataliza
Elektrokhim. im. D. V. Sokol'skogo, MON RK, Almaty, Kazakhstan).
Izvestiya Ministerstva Obrazovaniya i Nauki Respubliki Kazakhstan,
Natsional'noi Akademii Nauk Respubliki Kazakhstan, Seriya
Khimicheskaya
(6), 68-72 (Russian) 2002. CODEN: IMSKFR. ISSN: 1025-9341.
Publisher:
Nauchno-Izdatel'skii Tsentr "Gylym".

AB The morphol. and compn. of 2%**Ce**- modified Θ- **Al2O3** methane multicomponent combustion catalysts NiCuCr, MnBaSrCeLa after calcination to 1200 ° and **promoted** with traces of Pt (0.1-0.3%), **Pd** (0.05%), were studied with the aid of electron diffraction microscopy. The results are presented here. It was discovered that Mn-rare earth element-alk. earth element catalysts, in contrast to the NiCuCr contact, after high temp. processing in air, is organized into aluminate structures MeAl2O4, Me2AlO4, and appears as manganese hexaaluminate like LaMnAl11O19. This catalyst is an active methane combustion catalyst.

IT **7440-05-3, Palladium,** uses
RL: **CAT (Catalyst use)**; USES (Uses)
(metal **promoter** in **Ce**/Θ- **Al2O3**;
electron-microscopy study of multicomponent **Ce**/Θ-
Al2O3 -metal oxide methane combustion catalysts)

RN 7440-05-3 CAPLUS
CN Palladium (8CI, 9CI) (CA INDEX NAME)

Pd

CC 51-12 (Fossil Fuels, Derivatives, and Related Products)
Section cross-reference(s): 67

IT Oxides (inorganic), uses
Transition metal oxides
RL: **CAT (Catalyst use)**; USES (Uses)
(phases in calcined catalyst; electron-microscopy study of

multicomponent Ce/Θ-Al2O3 -metal oxide methane combustion
catalysts)

IT 7439-91-0, Lanthanum, uses 7439-96-5, Manganese, uses 7440-02-0, Nickel, uses **7440-05-3, Palladium**, uses 7440-06-4, Platinum, uses 7440-24-6, Strontium, uses 7440-39-3, Barium, uses 7440-47-3, Chromium, uses 7440-50-8, Copper, uses
RL: **CAT (Catalyst use)**; USES (Uses)
(metal **promoter** in **Ce/Θ- Al2O3**; electron-microscopy study of multicomponent **Ce/Θ-Al2O3** -metal oxide methane combustion catalysts)

IT 12014-44-7, Cerium aluminate (CeAlO3)
RL: **CAT (Catalyst use)**; USES (Uses)
(phase in calcined catalyst, phase in calcined catalyst, phase in calcined catalyst; electron-microscopy study of multicomponent Ce/Θ-Al2O3 -metal oxide methane combustion catalysts)

IT 522613-37-2, Aluminum lithium manganese oxide (Al11LiMnO19)
RL: **CAT (Catalyst use)**; USES (Uses)
(phase in calcined catalyst, phase in calcined catalyst; electron-microscopy study of multicomponent Ce/Θ-Al2O3 -metal oxide methane combustion catalysts)

IT 1304-28-5, Barium oxide, uses 1306-38-3, Cerium dioxide (CeO2), uses 1308-38-9, Chromium oxide (Cr2O3), uses 1313-13-9, Manganese dioxide (MnO2), uses 1314-06-3, Nickel oxide (Ni2O3) 1314-08-5, Palladium oxide (PdO) 1314-11-0, Strontium oxide, uses 1317-34-6, Manganese oxide (Mn2O3) 1317-35-7, Manganese oxide (Mn3O4) 1317-38-0, Copper oxide (CuO), uses 1317-39-1, Copper oxide (Cu2O), uses 1333-82-0, Chromium oxide (CrO3) 1345-13-7, Cerium oxide (Ce2O3) 7787-35-1, Barium manganese oxide (BaMnO4) 7787-36-2, Barium manganate
(Ba(MnO4)2)
12003-21-3, **AlCu** 12003-65-5, Aluminum lanthanum oxide (AlLaO3) 12004-35-2, Nickel aluminum oxide (NiAl2O4) 12018-01-8, Chromium
oxide
(CrO2) 12018-18-7, Nickel chromium oxide (NiCr2O4) 12035-82-4, Platinum oxide (PtO) 12042-92-1, Aluminum copper oxide (Al2CuO4) 12068-52-9, Aluminum manganese oxide (MnAl2O4) 12142-67-5, LaPt 12163-45-0, Manganese strontium oxide (SrMnO3) 12209-30-2, Manganese nickel oxide (MnNiO3) 12250-93-0, Copper aluminum oxide (CuAlO2) 12254-24-9, Aluminum strontium oxide (Al12SrO19) 12359-17-0, Nickel oxide (Ni2O) 12394-76-2, Chromium nickel oxide (CrNiO3)
13548-42-0,
Chromium Copper oxide (CrCuO4) 14721-18-7 39354-08-0, Nickel
aluminate
53169-13-4, Aluminum manganese oxide (AlMn2O4) 522613-26-9, Aluminum copper oxide (AlCuO4) 522613-28-1, Aluminum nickel oxide (Al26NiO42) 522613-29-2, Aluminum nickel oxide (Al2NiO3) 522613-30-5, Chromium

copper manganese oxide (Cr1.7CuMn0.9O4) 522613-31-6, Aluminum
manganese
oxide (AlMnO4) 522613-32-7, Aluminum nickel oxide (Al12NiO49)
522613-33-8, Aluminum manganese oxide (AlMnO3) 522613-35-0,
Manganese
nickel oxide (MnNiO4) 522613-39-4, Barium manganese oxide (BaMn2O4)
RL: **CAT (Catalyst use)**; USES (Uses)
(phase in calcined catalyst; electron-microscopy study of
multicomponent Ce/θ-Al2O3 -metal oxide methane combustion
catalysts)

IT 1344-70-3, Copper oxide 11099-02-8, Nickel oxide 11118-57-3,
Chromium
oxide 11129-18-3, Cerium oxide 39427-01-5, Copper aluminate
RL: **CAT (Catalyst use)**; USES (Uses)
(phases in calcined catalyst; electron-microscopy study of
multicomponent Ce/θ-Al2O3 -metal oxide methane combustion
catalysts)

IT 1344-28-1, Aluminum oxide (Al2O3), uses
RL: **CAT (Catalyst use)**; USES (Uses)
(θ-, modified with Ce; electron-microscopy study of
multicomponent Ce/θ-Al2O3 -metal oxide methane combustion
catalysts)

IT 7440-45-1, Cerium, uses
RL: **CAT (Catalyst use)**; USES (Uses)
(θ-Al2O3- modified with; electron-microscopy study of
multicomponent Ce/θ-Al2O3 -metal oxide methane combustion
catalysts)

L53 ANSWER 5 OF 22 CAPLUS COPYRIGHT 2004 ACS on STN
2002:868815 Document No. 137:372377 High surface area, small crystallite
size catalyst for **Fischer-Tropsch** synthesis. Hu, X.
D.; Loi, Patrick J.; O'Brien, Robert J. (Sud-Chemie, Inc., USA). PCT
Int.
Appl. WO 2002089978 A1 20021114, 49 pp. DESIGNATED STATES: W: AE,
AG,
AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU,
CZ,
DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL,
IN,
IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG,
MK,
MN, MW, MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SD, SE, SG, SI, SK,
SL,
TJ, TM, TN, TR, TT, TZ, UA, UG, UZ, VN, YU, ZA, ZM, ZW, AM, AZ, BY,
KG,

KZ, MD, RU, TJ, TM; RW: AT, BE, BF, BJ, CF, CG, CH, CI, CM, CY, DE,
DK,
ES, FI, FR, GA, GB, GR, IE, IT, LU, MC, ML, MR, NE, NL, PT, SE, SN,
TD,
TG, TR. (English). CODEN: PIXXD2. APPLICATION: WO 2002-US14095
20020506. PRIORITY: US 2001-851177 20010508.

AB The present development is a transition metal-based catalyst having a
high
surface area, a smooth, homogeneous surface morphol., an essentially
uniform distribution of cobalt throughout the support, and a small
metal
crystallite size. The high surface area transition metal-based
catalysts
of the present invention are prepd. in a non-acidic soln. at a pH
greater
than .apprx.7.0, and starting with a non-acidic transition metal
complex.
The resulting product is a catalyst with a uniform distribution of
metal
throughout the catalyst particles, with a smooth and homogeneous
surface
morphol., and with slow crystallite growth upon heating.

IT **1344-28-1**, Alumina, uses
RL: **CAT (Catalyst use)**; USES (Uses)
(catalyst support; high surface area, small crystallite size
catalyst
for **Fischer-Tropsch** synthesis)

RN 1344-28-1 CAPLUS
CN Aluminum oxide (Al_2O_3) (8CI, 9CI) (CA INDEX NAME)

*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***

IT **7440-05-3**, Palladium, uses **7440-18-8**, Ruthenium, uses
RL: **CAT (Catalyst use)**; USES (Uses)
(high surface area, small crystallite size catalyst for **Fischer-Tropsch** synthesis)

RN 7440-05-3 CAPLUS
CN Palladium (8CI, 9CI) (CA INDEX NAME)

Pd

RN 7440-18-8 CAPLUS
CN Ruthenium (8CI, 9CI) (CA INDEX NAME)

Henderson

Ru

IT **1314-23-4**, Zirconium oxide, uses **7440-45-1**,
Cerium, uses
RL: **CAT (Catalyst use)**; USES (Uses)
(**promoter**; high surface area, small crystallite size catalyst
for **Fischer-Tropsch** synthesis)
RN 1314-23-4 CAPLUS
CN Zirconium oxide (ZrO_2) (8CI, 9CI) (CA INDEX NAME)

O═Zr═O

RN 7440-45-1 CAPLUS
CN Cerium (8CI, 9CI) (CA INDEX NAME)

Ce

IC ICM B01J029-06
ICS B01J029-064; B01J029-068; B01J029-072; B01J029-076; B01J021-02;
B01J021-04; B01J021-06; B01J021-10; B01J021-12; B01J023-02;
B01J023-04; B01J023-06; B01J023-10; B01J023-12; B01J023-16;
B01J023-22; B01J023-24; B01J023-26; B01J023-28
CC 51-11 (Fossil Fuels, Derivatives, and Related Products)
Section cross-reference(s): 67
ST **Fischer Tropsch** catalyst transition metal complex
IT Clays, uses
RL: **CAT (Catalyst use)**; USES (Uses)
(attapulgitic, catalyst support; high surface area, small
crystallite
size catalyst for **Fischer-Tropsch** synthesis)
IT Clays, uses
Diatomite
Silicalites (zeolites)
Silicates, uses
Y zeolites
Zeolites (synthetic), uses
RL: **CAT (Catalyst use)**; USES (Uses)
(catalyst support; high surface area, small crystallite size
catalyst

for **Fischer-Tropsch** synthesis)
IT **Fischer-Tropsch** catalysts
Fischer-Tropsch reaction
(high surface area, small crystallite size catalyst for **Fischer**
-Tropsch synthesis)
IT Transition metal complexes
Transition metals, uses
RL: **CAT (Catalyst use)**; USES (Uses)
(high surface area, small crystallite size catalyst for **Fischer**
-Tropsch synthesis)
IT Rare earth metals, uses
RL: **CAT (Catalyst use)**; USES (Uses)
(promoter; high surface area, small crystallite size catalyst for
Fischer-Tropsch synthesis)
IT 1313-96-8, Niobia 1314-13-2, Zinc oxide, uses 1314-20-1, Thoria,
uses
1343-88-0, Magnesium silicate **1344-28-1**, Alumina, uses
7631-86-9, Silica, uses 12173-98-7, Mordenite 12304-65-3,
Hydrotalcite
21645-51-2, Alumina trihydrate, uses 24623-77-6, Alumina monohydrate
159995-97-8, Aluminum silicon oxide
RL: **CAT (Catalyst use)**; USES (Uses)
(catalyst support; high surface area, small crystallite size
catalyst
for **Fischer-Tropsch** synthesis)
IT 60-00-4D, Ethylenedinitrilo tetraacetic acid, complexes with cobalt
(II)
71-50-1D, Acetate, complexes with cobalt (II) 107-15-3D,
1,2-Diaminoethane, complexes with cobalt (II) 110-86-1D, Pyridine,
complexes with cobalt (II) 111-40-0D, Diethylenetriamine, complexes
with
cobalt (II) 112-24-3D, complexes with cobalt (II) 123-54-6D,
2,4-Pentanedione, complexes with cobalt (II) 144-62-7D, Oxalic acid,
complexes with cobalt (II) 603-35-0D, Triphenylphosphine, complexes
with
cobalt (II) 1314-68-7D, Rhenium (VII) oxide, complexes with cobalt
(II)
7439-88-5, Iridium, uses 7439-89-6, Iron, uses 7439-98-7,
Molybdenum,
uses 7440-02-0, Nickel, uses 7440-04-2, Osmium, uses **7440-05-3**
, Palladium, uses 7440-06-4, Platinum, uses 7440-15-5, Rhenium,
uses
7440-16-6, Rhodium, uses **7440-18-8**, Ruthenium, uses 7440-33-7,
Tungsten, uses 7440-47-3, Chromium, uses 7440-48-4, Cobalt, uses
7440-50-8, Copper, uses 7440-62-2, Vanadium, uses 7440-66-6, Zinc,

uses 7664-41-7D, Ammonia, complexes with cobalt (II) 7732-18-5D, Water, complexes with cobalt (II) 12648-47-4D, Platinum chloride, complexes with cobalt (II) 13933-32-9D, complexes with cobalt (II) 16887-00-6D, Chloride ion, complexes with cobalt (II) 20634-12-2D, complexes with cobalt (II) 22541-53-3D, complexes, uses
34513-98-9D,
Ruthenium nitrosyl nitrate, complexes with cobalt (II) 93687-50-4, Hexaammine cobalt carbonate
RL: **CAT (Catalyst use)**; USES (Uses)
(high surface area, small crystallite size catalyst for **Fischer -Tropsch** synthesis)

IT 1309-48-4, Magnesium oxide, uses 1313-59-3, Sodium oxide, uses **1314-23-4**, Zirconium oxide, uses 7429-91-6, Dysprosium, uses 7439-91-0, Lanthanum, uses 7439-94-3, Lutetium, uses 7439-96-5, Manganese, uses 7440-00-8, Neodymium, uses 7440-09-7, Potassium,
uses
7440-10-0, Praseodymium, uses 7440-12-2, Promethium, uses
7440-19-9,
Samarium, uses 7440-20-2, Scandium, uses 7440-24-6, Strontium,
uses
7440-27-9, Terbium, uses 7440-30-4, Thulium, uses 7440-42-8,
Boron,
uses **7440-45-1, Cerium**, uses 7440-46-2, Cesium, uses 7440-52-0, Erbium, uses 7440-53-1, Europium, uses 7440-54-2, Gadolinium, uses 7440-60-0, Holmium, uses 7440-64-4, Ytterbium,
uses
7440-65-5, Yttrium, uses 12136-45-7, Potassium oxide, uses
13463-67-7,
Titanium oxide, uses 18088-11-4, Rubidium oxide 20281-00-9, Cesium oxide
RL: **CAT (Catalyst use)**; USES (Uses)
(**promoter**; high surface area, small crystallite size catalyst for **Fischer-Tropsch** synthesis)

L53 ANSWER 6 OF 22 CAPLUS COPYRIGHT 2004 ACS on STN
2002:725766 Document No. 137:219316 Preparation of **Fischer-Tropsch** catalysts. Zennaro, Roberto; Pederzani, Giovanni; Bellussi, Giuseppe (Enitecnologie S.p.A., Italy). Ital. Appl. IT 2000MI1167 A1 20011126, 30 pp. (Italian). CODEN: ITXXCZ.
APPLICATION:
IT 2000-MI1167 20000526.
AB A procedure for prepn. of **Fischer-Tropsch** catalysts involves (1) prepn. of a catalyst precursor contg. 1 or more Group
VIII
metal(s) in form of oxides supported on inert supports (e.g., SiO2,

Al2O3), (2) redn. of the oxides from the step 1 to obtain the catalyst contg. 1 or more Group VIII metal(s) on the inert support, and (3) impregnation of the catalyst from the step 2 for re-oxidn. prevention
by
treatment with a hydrocarbon fraction b. 30-130° (preferably 60-100°) and contg. S <5, Cl <5, and N <5 ppm in a liq. state and successive solidification at 20-25°. Preferably, C20-40 alkanes are used as the hydrocarbon fraction. The Group VIII metals contain ≥80% Co.

IT **7440-18-8**, Ruthenium, uses **7440-45-1**, **Cerium**, uses
RL: **CAT (Catalyst use)**; MOA (Modifier or additive use); USES (Uses)
(**promoter** in prepn. of cobalt-based **Fischer-Tropsch** catalysts)

RN 7440-18-8 CAPLUS

CN Ruthenium (8CI, 9CI) (CA INDEX NAME)

Ru

RN 7440-45-1 CAPLUS

CN Cerium (8CI, 9CI) (CA INDEX NAME)

Ce

IT **1344-28-1**, Alumina, uses
RL: **CAT (Catalyst use)**; TEM (Technical or engineered material use); USES (Uses)
(support in prepn. of **Fischer-Tropsch** catalysts)

RN 1344-28-1 CAPLUS

CN Aluminum oxide (Al2O3) (8CI, 9CI) (CA INDEX NAME)

*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***

IC ICM C07C

CC 51-9 (Fossil Fuels, Derivatives, and Related Products)
Section cross-reference(s): 67

ST **Fischer Tropsch** catalyst prepn paraffin wax impregnation

IT Alkanes, uses
RL: TEM (Technical or engineered material use); USES (Uses)
(C20-40; in impregnation of **Fischer-Tropsch**

catalysts)
IT Paraffin waxes, uses
RL: TEM (Technical or engineered material use); USES (Uses)
(in impregnation of **Fischer-Tropsch** catalysts)
IT Group VIII elements
RL: TEM (Technical or engineered material use); USES (Uses)
(in prepn. of **Fischer-Tropsch** catalysts)
IT **Fischer-Tropsch** catalysts
(prepn. of)
IT Rare earth metals, uses
RL: MOA (Modifier or additive use); USES (Uses)
(promoter in prepn. of cobalt-based **Fischer-Tropsch**
catalysts)
IT 7440-48-4, Cobalt, uses
RL: **CAT (Catalyst use)**; TEM (Technical or engineered material
use); USES (Uses)
(in prepn. of **Fischer-Tropsch** catalysts)
IT 7439-91-0, Lanthanum, uses 7439-95-4, Magnesium, uses 7439-96-5,
Manganese, uses 7439-98-7, Molybdenum, uses 7440-09-7, Potassium,
uses
7440-15-5, Rhenium, uses **7440-18-8**, Ruthenium, uses 7440-21-3,
Silicon, uses 7440-23-5, Sodium, uses 7440-24-6, Strontium, uses
7440-25-7, Tantalum, uses 7440-29-1, Thorium, uses 7440-31-5, Tin,
uses 7440-33-7, Tungsten, uses 7440-39-3, Barium, uses
7440-45-1, Cerium, uses 7440-50-8, Copper, uses
7440-58-6, Hafnium, uses 7440-61-1, Uranium, uses 7440-66-6, Zinc,
uses 7440-67-7, Zirconium, uses 7440-70-2, Calcium, uses
RL: **CAT (Catalyst use)**; MOA (Modifier or additive use); USES
(Uses)
(**promoter** in prepn. of cobalt-based **Fischer-**
Tropsch catalysts)
IT **1344-28-1**, Alumina, uses 7631-86-9, Silica, uses
RL: **CAT (Catalyst use)**; TEM (Technical or engineered material
use); USES (Uses)
(support in prepn. of **Fischer-Tropsch** catalysts)

L53 ANSWER 7 OF 22 CAPLUS COPYRIGHT 2004 ACS on STN
2002:461818 Document No. 137:371654 Modification of catalytic
properties of
Pd/Al2O3 by rare earth addition: Catalytic activity and selectivity in
methanol decomposition. Cheng, Yang; Ren, Jie; Sun, Yuhan (State
Key Laboratory of Coal Conversion, Institute of Coal Chemistry,
Chinese
Academy of Sciences, Taiyuan, 030001, Peop. Rep. China). Zhongguo
Xitu

Not PA

Xuebao, 20(2), 176-178 (Chinese) 2002. CODEN: ZXXUE5. ISSN: 1000-4343.
Publisher: Yejin Gongye Chubanshe.

AB A series of **Pd** catalyst supported by CeO_2-and La_2O_3- modified γ- **Al_2O_3** was prepd. for **methanol** decompn. The catalytic properties were investigated and the effect of the following parameters was addressed: (1) Precursor salt of **Pd** (chloride or nitrate). (2) Rare earth nature (La and/or **Ce**). (3) Rare earth content (0 .apprx. 30%). (4) Impregnation mode (successive impregnations or co-impregnation). A synergistic effect between CeO_2 and La_2O_3 on γ- **Al_2O_3** is obsd. for **promoting** the catalytic properties of **Pd**, which results in high activity and selectivity for **methanol** decompn. into CO and H_2. For a **methanol** LHSV of 1.8 h^{-1}, at 250° **methanol** conversion reaches 91.4% with almost 100% selectivity of H_2 and CO.

IT **67-56-1, Methanol,** processes
RL: CPS (Chemical process); PEP (Physical, engineering or chemical process); PROC (Process)
(modification of catalytic properties of Pd/Al_2O_3 by rare earth addn for **methanol** decompn.)

RN 67-56-1 CAPLUS

CN Methanol (8CI, 9CI) (CA INDEX NAME)

H_3C-OH

CC 45-4 (Industrial Organic Chemicals, Leather, Fats, and Waxes)
Section cross-reference(s): 78

ST rare earth modification palladium alumina catalyst **methanol** decompn

IT Decomposition catalysts
(modification of catalytic properties of Pd/Al_2O_3 by rare earth addn for **methanol** decompn.)

IT 1306-38-3, Cerium dioxide, uses 1312-81-8, Lanthanum oxide 7440-05-3, Palladium, uses 10099-59-9, Lanthanum nitrate 10108-73-3, Cerium nitrate
RL: **CAT (Catalyst use)**; USES (Uses)
(modification of catalytic properties of Pd/Al_2O_3 by rare earth addn for **methanol** decompn.)

IT 67-56-1, **Methanol**, processes
RL: CPS (Chemical process); PEP (Physical, engineering or chemical process); PROC (Process)
(modification of catalytic properties of Pd/Al2O3 by rare earth addn for **methanol** decompn.)
IT 1344-28-1, Alumina, uses
RL: **CAT (Catalyst use)**; USES (Uses)
(γ; modification of catalytic properties of Pd/Al2O3 by rare earth addn for **methanol** decompn.)

L53 ANSWER 8 OF 22 CAPLUS COPYRIGHT 2004 ACS on STN
2002:312468 Document No. 137:22168 Promotion effects of CeO2 and Pd on Ni/γ-Al2O3 catalyst. Yang, Yong-Lai; Xu, Heng-Yong; Li, Wen-Zhao (Dalian Institute of Chemical Physics, Chinese Academy of Sciences, Dalian, 116023, Peop. Rep. China). Wuli Huaxue Xuebao, 18(4), 321-325 (Chinese) 2002. CODEN: WHXUEU. ISSN: 1000-6818. Publisher: Beijing Daxue Chubanshe.
AB The influence of the addn. of n-type semiconductor oxide CeO2 and noble metal **Pd** to Ni/γ- **Al2O3** catalyst on carbon deposition by CH4 and carbon elimination by CO2 was studied by using a pulse micro-reaction as well as BET, TPR, CO2-TPSR and hydrogen chemisorption techniques. It was found that, the addn. of n-type semiconductor CeO2 to Ni/γ- **Al2O3** catalyst could decrease carbon deposition activity of CH4 and increase carbon elimination ability of CO2; the addn. of noble metal **Pd** could further alter the interaction between support **Al2O3**, **promoter** CeO2 and active phase Ni, as a result, the performance of resistance to carbon deposition of Ni/γ- **Al2O3** catalyst was improved. At the same time, a new explanation for the above **promoting** effect was put forward by the models of carbon deposition by CH4 and carbon elimination by CO2 on the Ni-**Ce**-**Pd**/γ- **Al2O3** catalyst.
CC 51-11 (Fossil Fuels, Derivatives, and Related Products)
Section cross-reference(s): 67
ST cerium oxide palladium nickel alumina methane **reforming** catalyst
IT **Reforming** catalysts
(promotion effects of CeO2 and Pd on Ni/γ-Al2O3 catalyst)
IT 1306-38-3, **Cerium** oxide (CeO2), uses 1344-28-1, Alumina, uses 7440-02-0, Nickel, uses 7440-05-3, Palladium, uses
RL: **CAT (Catalyst use)**; USES (Uses)
(**promotion** effects of CeO2 and **Pd** on Ni/γ- **Al2O3** catalyst)

L53 ANSWER 9 OF 22 CAPLUS COPYRIGHT 2004 ACS on STN
2002:160316 Document No. 136:206040 Catalysts showing high thermal conductivity and their manufacture. Shiizaki, Shinji; Nagashima, Ikuo; Kameyama, Hideo (Kawasaki Heavy Industries, Ltd., Japan). Jpn. Kokai Tokkyo Koho JP 2002066337 A2 20020305, 9 pp. (Japanese). CODEN: JKXXAF.
APPLICATION: JP 2000-262454 20000831.

AB The substrate having an alumina layer, formed by anodization, is dipped in a soln. contg. weak acid or alkali and a catalyst for enlargement of the alumina pore diam. and for deposition of the catalysts in the pores and then treated for removal of the alumina layer to obtain a catalyst layer. Enlargement of alumina **pore size** may be carried out by treatment with alkali or acid. A support substance may be added to the above stated dipping soln., instead of the catalysts, for formation of a support layer on the substrate, followed by application of catalyst metals thereon. Thus prepd. catalysts are also claimed. Heat transfer in catalytic processes are carried out under high efficiency. The catalysts are suitable for use in endo- or exothermic catalytic reactions.

IT **1314-13-2**, Zinc oxide, uses
RL: **CAT (Catalyst use)**; PEP (Physical, engineering or chemical process); PYP (Physical process); PROC (Process); USES (Uses)
(catalyst support; formation of catalyst layers on thermal conductors by using anodized alumina layers)

RN 1314-13-2 CAPLUS

CN Zinc oxide (ZnO) (9CI) (CA INDEX NAME)

O=Zn

IT **7440-05-3**, Palladium, uses
RL: **CAT (Catalyst use)**; PEP (Physical, engineering or chemical process); PYP (Physical process); PROC (Process); USES (Uses)
(catalyst; formation of catalyst layers on thermal conductors by using

anodized alumina layers)
RN 7440-05-3 CAPLUS
CN Palladium (8CI, 9CI) (CA INDEX NAME)

Pd

IT **67-56-1, Methanol,** reactions
RL: RCT (Reactant); RACT (Reactant or reagent)
(decompn. of; formation of catalyst layers on thermal conductors by using anodized alumina layers)
RN 67-56-1 CAPLUS
CN Methanol (8CI, 9CI) (CA INDEX NAME)

H_3C-OH

IC ICM B01J037-00
ICS B01J023-44; B01J037-02; C25D011-18; C25D011-24
CC 67-1 (Catalysis, Reaction Kinetics, and Inorganic Reaction Mechanisms)
Section cross-reference(s): 51
IT Zeolites (synthetic), uses
RL: **CAT (Catalyst use)**; PEP (Physical, engineering or chemical process); PYP (Physical process); PROC (Process); USES (Uses)
(catalyst support; formation of catalyst layers on thermal conductors by using anodized alumina layers)
IT Anodization
Catalysts
Heat transfer
Reforming catalysts
Thermal conductors
(formation of catalyst layers on thermal conductors by using anodized alumina layers)
IT 1302-88-1, Cordierite 1306-38-3, Ceria, uses 1309-48-4, Magnesium oxide, uses **1314-13-2**, Zinc oxide, uses 1314-23-4, Zirconia, uses 1332-29-2, Tin oxide 1332-37-2, Iron oxide, uses 7631-86-9, Silica, uses 11098-99-0, Molybdenum oxide 11099-11-9, Vanadium oxide 11118-57-3, Chromium oxide 13463-67-7, Titania, uses
RL: **CAT (Catalyst use)**; PEP (Physical, engineering or chemical process); PYP (Physical process); PROC (Process); USES (Uses)

(catalyst support; formation of catalyst layers on thermal conductors
by using anodized alumina layers)
IT 7439-88-5, Iridium, uses 7439-89-6, Iron, uses 7439-96-5, Manganese,
uses 7440-02-0, Nickel, uses **7440-05-3**, Palladium, uses
7440-06-4, Platinum, uses 7440-15-5, Rhenium, uses 7440-16-6, Rhodium,
uses 7440-18-8, Ruthenium, uses 7440-22-4, Silver, uses 7440-31-5,
Tin, uses 7440-48-4, Cobalt, uses 7440-50-8, Copper, uses 7440-57-5,
Gold, uses 7440-66-6, Zinc, uses
RL: **CAT (Catalyst use)**; PEP (Physical, engineering or chemical
process); PYP (Physical process); PROC (Process); USES (Uses)
(catalyst; formation of catalyst layers on thermal conductors by using
anodized alumina layers)
IT **67-56-1, Methanol,** reactions
RL: RCT (Reactant); RACT (Reactant or reagent)
(decompn. of; formation of catalyst layers on thermal conductors by
using anodized alumina layers)
IT 37321-70-3, A1050
RL: **CAT (Catalyst use)**; PEP (Physical, engineering or chemical
process); PYP (Physical process); PROC (Process); USES (Uses)
(formation of catalyst layers on thermal conductors by using anodized
alumina layers)

L53 ANSWER 10 OF 22 CAPLUS COPYRIGHT 2004 ACS on STN
2002:100383 Document No. 136:328065 Synergistic promotion of CeO2 and La2O3
in Pd/Al2O3 catalysts for **methanol** decomposition. Yang, Cheng;
Ren, Jie; Sun, Yuhan (State Key Laboratory of Coal Conversion, Institute
of Coal Chemistry, Chinese Academy of Sciences, Taiyuan, 030001, Peop.
Rep. China). Catalysis Communications, 2(11-12), 353-356 (English) 2001.
CODEN: CCAOAC. ISSN: 1566-7367. Publisher: Elsevier Science B.V..
AB Pd catalysts supported on CeO2- and La2O3-modified γ-Al2O3 were
prepd. for **MeOH** decompn. to CO and H for fuel cell applications.
The CeO2 and La2O3 promote the catalytic activity of the Pd catalysts for
MeOH decompn.
IT **67-56-1, Methanol,** reactions

RL: CPS (Chemical process); PEP (Physical, engineering or chemical process); RCT (Reactant); PROC (Process); RACT (Reactant or reagent)
(activity of CeO2- and La2O3-promoted Pd/Al2O3 catalysts for **MeOH** decompn. to fuel gases for fuel cell applications)
RN 67-56-1 CAPLUS
CN Methanol (8CI, 9CI) (CA INDEX NAME)

H3C— OH

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
ST cerium oxide promoted palladium catalyst **methanol** decompn; lanthanum oxide promoted palladium catalyst **methanol** decompn; fuel cell application **methanol** decompn catalyst
IT Decomposition catalysts
Fuel cells
Fuel gases
(activity of CeO2- and La2O3-promoted Pd/Al2O3 catalysts for **MeOH** decompn. to fuel gases for fuel cell applications)
IT 1306-38-3, **Cerium** oxide, uses 1312-81-8, Lanthanum oxide 7440-05-3, Palladium, uses
RL: **CAT (Catalyst use)**; USES (Uses)
(activity of CeO2- and La2O3-**promoted Pd/ Al2O3** catalysts for **MeOH** decompn. to fuel gases for fuel cell applications)
IT **67-56-1, Methanol**, reactions
RL: CPS (Chemical process); PEP (Physical, engineering or chemical process); RCT (Reactant); PROC (Process); RACT (Reactant or reagent)
(activity of CeO2- and La2O3-promoted Pd/Al2O3 catalysts for **MeOH** decompn. to fuel gases for fuel cell applications)

L53 ANSWER 11 OF 22 CAPLUS COPYRIGHT 2004 ACS on STN
2002:51892 Document No. 136:120909 Chromium-based mixed oxides as catalysts
for converting C1-5-hydrocarbons to syngas. Kourtakis, Kostantinos; Gaffney, Anne M.; Wang, Lin (USA). U.S. Pat. Appl. Publ. US 2002006374 A1
20020117, 30 pp., Cont.-in-part of U.S. Ser. No. 703,701. (English). CODEN: USXXCO. APPLICATION: US 2001-785384 20010216. PRIORITY: US 1999-PV163843 19991105; US 2000-PV183423 20000218; US 2000-PV183575 20000218; US 2000-703701 20001101.
AB A chromium-based mixed oxide is used for the catalytic conversion of C1-5-hydrocarbons to carbon monoxide and hydrogen under partial oxidn. **promoting** conditions. The mixed oxide catalyst contains at least

one other metal, such as Li, Na, K, Rb, Cs, Mg, Ca, Sr, Ba, Cu, Ag,
Au,
Zn, Cd, La, **Ce**, Pr, Nd, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm, Yb, Lu,
Co, Ni, **Ru**, or Rh and has a structure other than perovskite.
The catalyst can also contain magnesia, silica, titanium dioxide,
tantalum
oxide, **zirconia** or **alumina** as an oxidatively and
thermally stable porous support in form of a three-dimensional
monolith,
reticulated ceramic, or ceramic foam, or for forming a xerogel or
aerogel
as a matrix (at least 30 wt.% of total wt.). These gels are prepd. by
reacting metal C1-4-alkoxides, such as tantalum n-butoxide, titanium
isopropoxide, and zirconium isopropoxide, with water at a molar ratio
of
1:0.1-10. The syngas prodn. process is carried out at 700-1,000°C,
130-10,000 kPa, and a space velocity of the reaction mixt. of
50,000-50,000,000 NL/kg/h with a catalyst contact time of ≤ 10 ms.
The reactant gas mixt. has a C:O ratio of about 2:1 and contains at
least
80 vol.% of methane.

IC ICM C01B031-18
ICS C01B003-26; B01J023-26
NCL 423418200
CC 51-11 (Fossil Fuels, Derivatives, and Related Products)
Section cross-reference(s): 67
IT Alkali metal oxides
Alkaline earth oxides
Rare earth oxides
Transition metal oxides
RL: **CAT (Catalyst use)**; USES (Uses)
(mixed oxide catalyst contg.; chromium-based mixed oxides as
catalysts
for converting C1-5 hydrocarbons to syngas)
IT 59165-25-2, Chromium Cobalt lanthanum oxide
RL: **CAT (Catalyst use)**; USES (Uses)
(catalyst; chromium-based mixed oxides as catalysts for converting
C1-5
hydrocarbons to syngas)
IT 11104-65-7P, Chromium copper oxide 12016-69-2P, Chromium cobalt
oxide
(Cr2CoO4) 12619-67-9P, Chromium magnesium oxide 12640-79-8P,
Nickel
tungsten oxide 12673-58-4P, Molybdenum Nickel oxide 12687-47-7P,
Chromium nickel oxide 12737-27-8P, Chromium iron oxide
12771-00-5P,

Copper tungsten oxide 12777-94-5P, Chromium Lanthanum oxide
13762-14-6P, Cobalt molybdenum oxide (CoMoO4) 39318-26-8P, Chromium
vanadium oxide 39432-73-0P, Chromium manganese oxide 39455-56-6P,
Chromium tungsten oxide 50922-29-7P, Chromium zinc oxide
51142-84-8P,
Copper Molybdenum oxide 51845-82-0P, Cerium chromium oxide
56214-02-9P, Chromium samarium oxide 181790-65-8P, Chromium cobalt
titanium oxide 200711-37-1P, Chromium lanthanum nickel oxide
204759-73-9P, Chromium magnesium silicon oxide 356068-71-8P,
Aluminum
chromium gold oxide 356068-72-9P, Chromium gold magnesium oxide
356068-74-1P, Chromium nickel yttrium oxide 356068-75-2P, Cerium
chromium nickel oxide 356068-76-3P, Chromium magnesium hydroxide
oxide
389964-31-2P, Chromium lanthanum lithium oxide
RL: **CAT (Catalyst use)**; SPN (Synthetic preparation); PREP
(Preparation); USES (Uses)
(catalyst; chromium-based mixed oxides as catalysts for converting
C1-5
hydrocarbons to syngas)

IT 1308-38-9P, Dichromium trioxide, uses
RL: **CAT (Catalyst use)**; SPN (Synthetic preparation); PREP
(Preparation); USES (Uses)
(freeze-dried or aerogel, catalyst; chromium-based mixed oxides as
catalysts for converting C1-5 hydrocarbons to syngas)

IT 546-68-9, Titanium isopropoxide 2171-98-4, Zirconium isopropoxide
51094-78-1, 1-**Butanol**, tantalum(5+) salt
RL: **CAT (Catalyst use)**; USES (Uses)
(gel formation using; chromium-based mixed oxides as catalysts for
converting C1-5 hydrocarbons to syngas)

IT 1304-28-5, Barium oxide, uses 1305-78-8, Calcium oxide, uses
1306-19-0, Cadmium oxide, uses 1308-87-8, Dysprosium oxide
1312-81-8,
Lanthanum oxide 1313-59-3, Sodium oxide, uses 1313-99-1, Nickel
oxide,
uses 1314-11-0, Strontium oxide, uses 1314-13-2, Zinc oxide, uses
1344-70-3, Copper oxide 11104-61-3, Cobalt oxide 11113-84-1,
Ruthenium
oxide 11129-18-3, Cerium oxide 12036-32-7, Praseodymium oxide
12057-24-8, Lithium oxide, uses 12061-16-4, Erbium oxide
12064-62-9,
Gadolinium oxide 12136-45-7, Potassium oxide, uses 12648-30-5,
Neodymium oxide 12651-06-8, Samarium oxide 12651-43-3, Ytterbium
oxide
12680-36-3, Rhodium oxide 12738-76-0, Terbium oxide 12770-85-3,

Europium oxide 18088-11-4, Rubidium oxide 20281-00-9, Cesium oxide 20667-12-3, Silver oxide 39403-39-9, Gold oxide 39455-61-3, Holmium oxide 39455-67-9, Lutetium oxide 39455-81-7, Thulium oxide
RL: **CAT (Catalyst use)**; USES (Uses)
(mixed oxide contg.; chromium-based mixed oxides as catalysts for converting C1-5 hydrocarbons to syngas)

IT 1309-48-4, Magnesia, uses 1314-23-4, Zirconia, uses 1344-28-1, α-Alumina, uses 7631-86-9, Silica, uses 13463-67-7, Titanium oxide, uses 59763-75-6, Tantalum oxide
RL: **CAT (Catalyst use)**; USES (Uses)
(support; chromium-based mixed oxides as catalysts for converting C1-5 hydrocarbons to syngas)

L53 ANSWER 12 OF 22 CAPLUS COPYRIGHT 2004 ACS on STN
2001:651734 Document No. 135:359351 Effect of the promotion of ceria on Pd/MgO catalyst for **methanol** synthesis. Imamura, Seiichiro; Denpo, Katsuaki; Kanai, Hiroyoshi; Yamane, Hideyuki; Saito, Yoshio; Utani, Kazunori; Matsumura, Yasuyuki (Faculty of Engineering and Design, Kyoto Institute of Technology, Kyoto, 606-8585, Japan). Sekiyu Gakkaishi, 44(5), 293-302 (English) 2001. CODEN: SKGSAE. ISSN: 0582-4664. Publisher: Sekiyu Gakkai.

AB The hydrogenation of CO was carried out over **Pd** supported on MgO. The addn. of various lanthanide oxides increased the activity of **Pd**/MgO to produce **methanol**. CeO2 exhibited the highest **promoting** effect at a temp. as low as of 250°C and the optimum molar ratio of **Ce/Pd** was about unity. TPR expt. showed that CeO2 on MgO (without **Pd**) suffered less redn. with hydrogen compared with that supported on **Al2O3**. Thus, the former retained the **Ce**(IV) state almost completely under the reducing condition, which was ascertained by XAFS measurement. XAFS anal. also indicated that **Pd** in **Pd**/MgO suffered redn. extensively while that in **Pd**/CeO2/MgO partly retained the oxidized state owing to the redn.-resistant CeO2 on MgO. The results of CO adsorption XPS, XAFS, and TEM measurement revealed that addn. of CeO2 increased the dispersion of **Pd** metal particles. It was concluded that the high activity of the catalyst resulted from the combination of highly dispersed **Pd** metal and partly oxidized **Pd** component with a **Pd**-O bond.

IT **67-56-1P, Methanol,** preparation
RL: SPN (Synthetic preparation); PREP (Preparation)
(ceria promotion of Pd/MgO catalyst for **methanol** synthesis)
RN 67-56-1 CAPLUS
CN Methanol (8CI, 9CI) (CA INDEX NAME)

H_3C-OH

CC 45-4 (Industrial Organic Chemicals, Leather, Fats, and Waxes)
Section cross-reference(s): 52
ST carbon monoxide hydrogenation catalyst **methanol** prepn
IT 1306-38-3, Ceria, uses 7440-05-3, Palladium, uses
RL: **CAT (Catalyst use);** USES (Uses)
(ceria promotion of Pd/MgO catalyst for **methanol** synthesis)
IT 630-08-0, Carbon monoxide, reactions
RL: PEP (Physical, engineering or chemical process); RCT (Reactant); PROC (Process); RACT (Reactant or reagent)
(ceria promotion of Pd/MgO catalyst for **methanol** synthesis)
IT **67-56-1P, Methanol,** preparation
RL: SPN (Synthetic preparation); PREP (Preparation)
(ceria promotion of Pd/MgO catalyst for **methanol** synthesis)

L53 ANSWER 13 OF 22 CAPLUS COPYRIGHT 2004 ACS on STN
2001:146953 Document No. 134:254455 **Methanol** decomposition to synthesis gas at low temperature over palladium supported on ceria-zirconia solid solutions. Liu, Y.; Hayakawa, T.; Ishii, T.; Kumagai, M.; Yasuda, H.; Suzuki, K.; Hamakawa, S.; Murata, K. (Chemical Technology Division, Institute of Research and Innovation, Chiba, Kashiwa, Takada, Japan). Applied Catalysis, A: General, 210(1,2), 301-314
Not PA (English) 2001. CODEN: ACAGE4. ISSN: 0926-860X. Publisher: Elsevier Science B.V..
AB The $Ce_xZr_{1-x}O_2$ solid soln. was used as a support of a **palladium** catalyst for **methanol** decompn. to synthesis gas at low temp. All **Pd**-contg. catalysts tested in this study showed high selectivity to synthesis gas (over 96%). The **Pd** supported on the composite oxide with a **Ce**/Zr molar ratio of 4/1 exhibited the highest activity. **Pd**/$Ce_{0.8}Zr_{0.2}O_2$ (17 wt. %) (Cop) (prepd. by copptn. method) showed a conversion of 51.2% for the **methanol** decompn. at 473 K, which was higher than those over 17 wt. % **Pd** /CeO_2 (cop) (40.7%) and 17 wt. % **Pd**/ZrO_2 (cop)

(24.3%) at 473 K. The 17 wt. % **Pd**/Ce0.8Zr0.2O2 (cop) catalyst showed a higher BET surface area and smaller **Pd** particles than those of 17 wt. % **Pd**/CeO2 (cop). Moreover, a more active **Pd**.sigma.+ state could be maintained by Zr4+ ion modification due to **promotion** of the oxygen mobility and enhancement of the reducibility and increase in the acid sites of the CeO2 support. The 17 wt.% **Pd**/Ce0.8Zr0.2O2 (cop) catalyst showed a much higher conversion (51.2%) than that over 17 wt. % **Pd**/Ce0.8Zr0.2O2 (imp) (prepd. by impregnation method) (17.2%) at 473 K. This is due to the 17 wt. % **Pd**/Ce0.8Zr0.2O2 (cop) possessing many small **Pd** particles. The 17 wt.% **Pd**/Ce0.8Zr0.2O2 (cop) catalyst showed an initial conversion of 51.2% at 473 K but the conversion decreased to 43.1% after 24 h on stream. This deactivation was attributed to carbonaceous deposit on the catalyst surface. The amts. of coke on the 17 wt. % **Pd**/Ce0.8Zr0.2O2 (cop) catalyst were 0.9 wt. % After 24 h on stream at 473 K and 2.1 wt. % After 1 h on stream at 523 K.

IT **67-56-1, Methanol,** processes
RL: PEP (Physical, engineering or chemical process); PROC (Process)
(**methanol** decompn. to synthesis gas at low temp. over palladium supported on ceria-zirconia solid solns.)

RN 67-56-1 CAPLUS

CN Methanol (8CI, 9CI) (CA INDEX NAME)

H3C—OH

CC 51-11 (Fossil Fuels, Derivatives, and Related Products)

ST **methanol** decompn catalysts palladium ceria zirconia syngas

IT Decomposition catalysts
Synthesis gas
(**methanol** decompn. to synthesis gas at low temp. over palladium supported on ceria-zirconia solid solns.)

IT 1306-38-3, Ceria, uses 1314-23-4, Zirconia, uses 7440-05-3, Palladium, uses
RL: **CAT (Catalyst use)**; USES (Uses)
(**methanol** decompn. to synthesis gas at low temp. over palladium supported on ceria-zirconia solid solns.)

IT **67-56-1, Methanol,** processes
RL: PEP (Physical, engineering or chemical process); PROC (Process)

(**methanol** decompn. to synthesis gas at low temp. over palladium supported on ceria-zirconia solid solns.)

L53 ANSWER 14 OF 22 CAPLUS COPYRIGHT 2004 ACS on STN
2001:7599 Document No. 134:58950 Extended catalyst life in a two-stage **Fischer-Tropsch** hydrocarbon synthesis process. Beer, Gary L. (Syntroleum Corporation, USA). U.S. US 6169120 B1 20010102, 5 pp. (English). CODEN: USXXAM. APPLICATION: US 1999-397474 19990917.
AB An extended catalyst life two-stage hydrocarbon synthesis process is presented where a first synthesis gas stream is reacted in a first-stage reactor in the presence of a suitable catalyst (e.g., Co/alumina) to produce liq. hydrocarbon products and a gaseous stream; the gaseous stream is cooled and water and liq. hydrocarbons are sepd. from the gaseous stream to produce a second synthesis gas stream which is then passed to a second stage reactor for the prodn. of addnl. liq. hydrocarbons.
IT **7440-18-8**, Ruthenium, uses **7440-45-1**, **Cerium**, uses
RL: **CAT (Catalyst use)**; USES (Uses)
(catalyst **promoter**; extended catalyst life in a two-stage **Fischer-Tropsch** hydrocarbon synthesis process using)
RN 7440-18-8 CAPLUS
CN Ruthenium (8CI, 9CI) (CA INDEX NAME)

Ru

RN 7440-45-1 CAPLUS
CN Cerium (8CI, 9CI) (CA INDEX NAME)

Ce

IT **1344-28-1**, Alumina, uses
RL: **CAT (Catalyst use)**; USES (Uses)
(support; extended catalyst life in a two-stage **Fischer-Tropsch** hydrocarbon synthesis process)
RN 1344-28-1 CAPLUS
CN Aluminum oxide (Al2O3) (8CI, 9CI) (CA INDEX NAME)

*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***
IC ICM C07C027-00
NCL 518715000
CC 51-9 (Fossil Fuels, Derivatives, and Related Products)
Section cross-reference(s): 48, 67
ST **Fischer Tropsch** hydrocarbon manuf extended catalyst life
IT Reactors
(column, slurry-bubble; extended catalyst life in a two-stage **Fischer-Tropsch** hydrocarbon synthesis process using)
IT **Fischer-Tropsch** catalysts
Synthesis gas
(extended catalyst life in a two-stage **Fischer-Tropsch** hydrocarbon synthesis process)
IT Hydrocarbons, preparation
RL: IMF (Industrial manufacture); PREP (Preparation)
(extended catalyst life in a two-stage **Fischer-Tropsch** hydrocarbon synthesis process)
IT **Fischer-Tropsch** reaction
(hydrocarbon-synthesis process using a two-stage)
IT Columns and Towers
(reactor, slurry-bubble; extended catalyst life in a two-stage **Fischer-Tropsch** hydrocarbon synthesis process using)
IT 7727-37-9, Nitrogen, uses
RL: NUU (Other use, unclassified); USES (Uses)
(carrier; extended catalyst life in a two-stage **Fischer-Tropsch** hydrocarbon synthesis process using)
IT 7440-15-5, Rhenium, uses **7440-18-8**, Ruthenium, uses 7440-32-6, Titanium, uses **7440-45-1, Cerium**, uses 7440-58-6, Hafnium, uses 7440-61-1, Uranium, uses 7440-67-7, Zirconium, uses
RL: **CAT (Catalyst use)**; USES (Uses)
(catalyst **promoter;** extended catalyst life in a two-stage **Fischer-Tropsch** hydrocarbon synthesis process using)
IT 7440-48-4, Cobalt, uses
RL: **CAT (Catalyst use)**; USES (Uses)
(extended catalyst life in a two-stage **Fischer-Tropsch** hydrocarbon synthesis process)
IT 630-08-0, Carbon monoxide, reactions 1333-74-0, Hydrogen, reactions
RL: RCT (Reactant); RACT (Reactant or reagent)
(extended catalyst life in a two-stage **Fischer-Tropsch** hydrocarbon synthesis process)
IT **1344-28-1**, Alumina, uses
RL: **CAT (Catalyst use)**; USES (Uses)
(support; extended catalyst life in a two-stage **Fischer-Tropsch** hydrocarbon synthesis process)

L53 ANSWER 15 OF 22 CAPLUS COPYRIGHT 2004 ACS on STN
2000:899081 Document No. 134:193065 Influence of Mg and Ce addition to ruthenium based catalysts used in the selective hydrogenation of α,β-unsaturated aldehydes. Bachiller-Baeza, B.; Rodriguez-Ramos, I.; Guerrero-Ruiz, A. (C.S.I.C. Campus de Cantoblanco, Instituto de Catalisis y Petroleoquimica, Madrid, 28049, Spain). Applied Catalysis, A: General, 205(1,2), 227-237 (English) 2001. CODEN: ACAGE4. ISSN: 0926-860X. OTHER SOURCES: CASREACT 134:193065. Publisher: Elsevier Science B.V..

AB **Ce** and Mg were used as **promoters** in two series of **Ru** based catalysts supported on **alumina** (**Al2O3**) and activated carbon (AC). The catalysts were characterized by H2 chemisorption and temp.-programmed redn. (TPR), and studied in the crotonaldehyde (gas phase) and the citral (liq. phase) hydrogenations. Addn. of MgO and CeO2 decreased the catalytic activity in crotonaldehyde and citral hydrogenations. With regard to the selectivity towards unsatd. **alcs.**, similar trends were obsd. for the two reactions. MgO did not influence the selectivity, but CeO2 increased the selectivity to unsatd. **alcs.**, esp. on carbon supported catalyst. Bulk CeO2 and **Ce**/AC catalyst showed low activity but very high selectivity (93 and 100%, resp.) to the unsatd. **alcs.** Based on these results and the calorimetric expts. of CO adsorption it was suggested that defect sites on the surface of the **promoter** are the active and highly selective sites for unsatd. aldehydes due to their influence on the C:O bond activation.

CC 22-7 (Physical Organic Chemistry)
Section cross-reference(s): 30

IT 1306-38-3, Cerium dioxide, uses 1309-48-4, Magnesium oxide, uses 7440-18-8, Ruthenium, uses
RL: **CAT (Catalyst use)**; USES (Uses)
(catalysts in selective hydrogenation of α,β-unsatd. aldehydes)

IT 6117-91-5P, Crotyl **alcohol**
RL: SPN (Synthetic preparation); PREP (Preparation)
(catalysts in selective hydrogenation of α,β-unsatd. aldehydes)

L53 ANSWER 16 OF 22 CAPLUS COPYRIGHT 2004 ACS on STN
1999:210576 Document No. 130:314085 Modification of the catalytic properties of palladium by rare earth (La, Ce) addition, catalytic activity and selectivity in hydrocarbon conversion. Kili, K.; Le Normand, F. (Laboratoire d'Etudes de la Riactiuiti Catalytique des Surfaces et Interfaces (LERCSI), UMR CNRS-ULP-ECPM, Strasbourg, 67070, Fr.). Journal of Molecular Catalysis A: Chemical, 140(3), 267-285 (English) 1999. CODEN: JMCCF2. ISSN: 1381-1169. Publisher: Elsevier Science B.V..

AB **Pd/Al2O3** catalysts modified by **cerium** or lanthanum **promoters** are tested for hydrocarbon conversion: methylcyclopentane (MCP) hydrogenolysis, 2-methylpentane (2MP) isomerization and 3-methylhexane (3MH) hydrocracking, dehydrocyclization and aromatization. The following parameters are reviewed: (i) precursor salt of **palladium** (chloride or nitrate), (ii) rare earth nature (La or **Ce**), (iii) rare earth content within the range 0-100% and (iv) impregnation mode (coimpregnation or successive impregnations). The influence of chloride coming from the precursor salt of **palladium** on the catalytic behavior is strongly underlined. Chlorine anions are trapped by rare earth cations at the interface, as evidenced in a subsequent paper dealing with characterization studies of these same catalysts. Although the reactions readily occur on metallic sites, as evidenced by 13C labeled expts., the addn. of rare earth increases the activity and modifies the selectivity, esp. for 2MP isomerization. These changes are rationalized in terms of significant modification of the kinetic surface parameters (competitive hydrogen and hydrocarbon coverages). This is explained by (i) lowering of the hydrogen coverage of the **palladium** sites accompanying surface diffusion on the interface with the support and (ii) creation of new selective sites at the transition metal-rare earth interface. The other parameters investigated yield only minor changes of the catalytic behavior.

CC 51-6 (Fossil Fuels, Derivatives, and Related Products)
Section cross-reference(s): 67

ST petroleum **reforming** catalyst palladium cerium lanthanum

IT Aromatization catalysts
Hydrocracking catalysts

Hydrogenolysis catalysts
Isomerization catalysts
Petroleum **reforming** catalysts
(modification of the catalytic properties of palladium by rare earth
(La, Ce) addn., catalytic activity and selectivity in hydrocarbon conversion)
IT 7439-91-0, Lanthanum, uses 7440-05-3, Palladium, uses 7440-45-1, Cerium, uses
RL: **CAT (Catalyst use)**; USES (Uses)
(modification of the catalytic properties of palladium by rare earth
(La, Ce) addn., catalytic activity and selectivity in hydrocarbon conversion)

L53 ANSWER 17 OF 22 CAPLUS COPYRIGHT 2004 ACS on STN
1998:633231 Document No. 129:318254 Ruthenium catalysts for high temperature
solar **reforming** of methane. Berman, A.; Epstein, M. (Solar Research Facilities Unit, Weizmann Institute of Science, Israel). Hydrogen Power: Theoretical and Engineering Solutions, Proceedings of the
HYPOTHESIS Symposium, 2nd, Grimstad, Norway, Aug. 18-22, 1997, Meeting Date 1997, 213-218. Editor(s): Saetre, T. O. Kluwer: Dordrecht, Neth.
(English) 1998. CODEN: 66STAR.
AB The **reforming** of CH_4 with CO_2 on **Ru/Al_2O_3** catalysts **promoted** with ceria is described. Effects of **Ce** on the activity and thermal stability of the catalysts were studied. Data for unpromoted **Ru** catalysts are given for comparison. The active centers of the **promoted Ru-Ce** catalyst supported on **alumina** have a dynamic structure which can be changed in the course of the reaction.
CC 49-1 (Industrial Inorganic Chemicals)
Section cross-reference(s): 51, 52, 67
ST solar **reforming** methane ruthenium catalyst
IT **Reforming**
Reforming catalysts
Solar energy
(ruthenium catalysts for high temp. solar **reforming** of methane)
IT 1344-28-1, Alumina, uses 7440-18-8, Ruthenium, uses
RL: **CAT (Catalyst use)**; USES (Uses)
(ruthenium catalysts for high temp. solar **reforming** of methane)

IT 1306-38-3, Ceria, uses
RL: **CAT (Catalyst use)**; MOA (Modifier or additive use); USES (Uses)
(ruthenium catalysts for high temp. solar **reforming** of methane)
IT 74-82-8, Methane, reactions 124-38-9, Carbon dioxide, reactions
RL: RCT (Reactant); RACT (Reactant or reagent)
(ruthenium catalysts for high temp. solar **reforming** of methane)
IT 1333-74-0P, Hydrogen, preparation
RL: SPN (Synthetic preparation); PREP (Preparation)
(ruthenium catalysts for high temp. solar **reforming** of methane)

L53 ANSWER 18 OF 22 CAPLUS COPYRIGHT 2004 ACS on STN
1998:297866 Document No. 129:31593 Method for catalytic purification of combustion waste gases using **ethanol** with complete reaction.
Saito, Mika; Aoyama, Naoko; Yoshida, Kiyohide; Feng, Kei Sai (Tsusho Sangyosho Kiso Sangyo Kyoku, Japan). Jpn. Kokai Tokkyo Koho JP 10118459
A2 19980512 Heisei, 7 pp. (Japanese). CODEN: JKXXAF. APPLICATION: JP
1996-295880 19961018.
AB The method is carried out by arranging gas purifying agent along the exhaust gas passage, which comprises a 1st silver-contg. catalyst near the gas inlet and a 2nd tin-contg. catalyst near the gas outlet, for complete reaction of **ethanol** with NOx. The 1st catalyst is made of porous inorg. oxides (e.g., γ- **alumina**) loaded with silver or silver oxide, and the 2nd catalyst is made of porous inorg. oxides loaded with tin-contg. oxide and ≥1 transition metal(s) selected from platinum; **palladium**; **ruthenium**; gold; and iridium.
IT **64-17-5, Ethanol**, processes
RL: NUU (Other use, unclassified); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)
(method for catalytic purifn. of combustion waste gases using **ethanol** with complete reaction)
RN 64-17-5 CAPLUS
CN Ethanol (9CI) (CA INDEX NAME)

H_3C-CH_2-OH

IC ICM B01D053-94
ICS B01D053-86; B01J023-14; B01J023-50; B01J023-54
CC 59-3 (Air Pollution and Industrial Hygiene)
ST waste combustion gas purifn catalyst **ethanol**; exhaust gas nitrogen oxide removal catalyst
IT Exhaust gases (engine)
Waste gases
(method for catalytic purifn. of combustion waste gases using **ethanol** with complete reaction)
IT 1344-28-1, γ-Alumina, uses 7439-88-5, Iridium, uses 7440-05-3, Palladium, uses 7440-06-4, Platinum, uses 7440-18-8, Ruthenium, uses
7440-22-4, Silver, uses 7440-57-5, Gold, uses 20667-12-3, Silver oxide
RL: **CAT (Catalyst use)**; USES (Uses)
(method for catalytic purifn. of combustion waste gases using **ethanol** with complete reaction)
IT **64-17-5, Ethanol**, processes
RL: NUU (Other use, unclassified); PEP (Physical, engineering or chemical
process); PROC (Process); USES (Uses)
(method for catalytic purifn. of combustion waste gases using **ethanol** with complete reaction)
IT 11104-93-1, Nitrogen oxide, processes
RL: PEP (Physical, engineering or chemical process); REM (Removal or disposal); PROC (Process)
(method for catalytic purifn. of combustion waste gases using **ethanol** with complete reaction)

L53 ANSWER 19 OF 22 CAPLUS COPYRIGHT 2004 ACS on STN
1997:32485 Document No. 126:119708 The preparation of advanced catalytic materials by aerosol processes. Moser, William R.; Lennhoff, John D.; Cnossen, Jack E.; Fraska, Karen; Schoonover, Justin W.; Rozak, Jeffrey R.
(Department Chemical Engineering, Worcester Polytechnic Institute, Worcester, MA, 01609, USA). Advanced Catalysts and Nanostructured Materials, 535-562. Editor(s): Moser, William R. Academic: San Diego, Calif. (English) 1996. CODEN: 63URAA.
AB A review, with 50 refs., of aerosol techniques for catalyst prepn., esp.

for industrially important catalysts. Topics discussed include: (1) a historical background, (2) advanced catalyst synthesis by high-temp. aerosol decompn. (e.g., reactor configuration), (3) representative catalysts prepd. by this method [e.g., metal-**promoted** La ferrate perovskites and Fe oxides for **Fischer-Tropsch** reaction; copper-modified zinc chromites for higher **alc.** synthesis; bismuth molybdates and modified bismuth molybdates for propylene oxidn. to acrolein; copper-zinc aluminate **methanol** synthesis catalysts; cobalt molybdate hydrodesulfurization catalysts; perovskite-type Sr-**Ce**-Yb oxide catalysts for methane oxidative coupling; alkali-metal modified Zn oxide catalysts;
vanadium-phosphorus
oxide catalysts for partial oxidn. (e.g., for manuf. of maleic
anhydride);
noble-metal petroleum dehydrogenation catalysts; **alumina** -supported silver catalysts for partial oxidn. (e.g., for manuf. of ethylene oxide); **Pd** on reactive supports for total oxidn. of waste hydrocarbons], and (4) the potential for processing of aerosols
in
manuf. of com. catalysts.

IT **67-56-1P, Methanol,** preparation
RL: FMU (Formation, unclassified); IMF (Industrial manufacture); FORM (Formation, nonpreparative); PREP (Preparation)
(aerosol-based techniques for manuf. of copper-zinc-aluminate-type catalysts for **methanol** synthesis)

RN 67-56-1 CAPLUS

CN Methanol (8CI, 9CI) (CA INDEX NAME)

H_3C-OH

CC 51-0 (Fossil Fuels, Derivatives, and Related Products)
Section cross-reference(s): 35, 60, 67

ST review aerosol catalyst manuf; **Fischer Tropsch** aerosol catalyst review; **methanol** synthesis aerosol catalyst review; partial oxidn aerosol catalyst review; oxidative coupling aerosol
catalyst
review; waste gas oxidn aerosol catalyst review

IT **Alcohols,** preparation
RL: FMU (Formation, unclassified); IMF (Industrial manufacture); FORM (Formation, nonpreparative); PREP (Preparation)
(C>1; aerosol-based techniques for manuf. of spinel-type **methanol**-synthesis catalysts)

IT Hydrogenation catalysts

(aerosol-based techniques for manuf. of **Fischer-Tropsch** and **methanol** synthesis catalysts)
IT Chromium spinels
RL: **CAT (Catalyst use)**; SPN (Synthetic preparation); PREP (Preparation); USES (Uses)
(copper-modified zinc chromites; aerosol-based techniques for manuf. of spinel-type **methanol**-synthesis catalysts)
IT Perovskite-type crystals
RL: **CAT (Catalyst use)**; SPN (Synthetic preparation); PREP (Preparation); USES (Uses)
(lanthanum ferrates [Lax(Ca,Sr)1-xFeO3]; aerosol-based techniques for manuf. of **Fischer-Tropsch** catalysts)
IT Rare earth oxides
RL: **CAT (Catalyst use)**; USES (Uses)
(lanthanum ferrates, perovskites; aerosol-based techniques for manuf. of **Fischer-Tropsch** catalysts)
IT 7440-05-3, Palladium, uses
RL: **CAT (Catalyst use)**; USES (Uses)
(aerosol-based techniques for manuf. of Pd on reactive supports for total oxidn. of hydrocarbons in waste gases)
IT 13595-85-2P, Bismuth molybdate (Bi2Mo3O12) 146956-92-5P, Bismuth iron molybdenum oxide ((Bi,Fe)2Mo3O12)
RL: **CAT (Catalyst use)**; SPN (Synthetic preparation); PREP (Preparation); USES (Uses)
(aerosol-based techniques for manuf. of bismuth molybdate-type partial oxidn. catalysts for manuf. of propane to acrolein)
IT 56450-21-6P, Aluminum copper zinc oxide
RL: **CAT (Catalyst use)**; SPN (Synthetic preparation); PREP (Preparation); USES (Uses)
(aerosol-based techniques for manuf. of copper-zinc-aluminate-type catalysts for **methanol** synthesis)
IT **67-56-1P, Methanol**, preparation
RL: FMU (Formation, unclassified); IMF (Industrial manufacture); FORM (Formation, nonpreparative); PREP (Preparation)
(aerosol-based techniques for manuf. of copper-zinc-aluminate-type catalysts for **methanol** synthesis)
IT 7439-88-5P, Iridium, uses 7440-06-4P, Platinum, uses
RL: **CAT (Catalyst use)**; SPN (Synthetic preparation); PREP (Preparation); USES (Uses)
(aerosol-based techniques for manuf. of noble metal-based petroleum

dehydrogenation catalysts)
IT 186257-34-1P, Lithium zinc oxide (Li0-0.4Zn0.6-1O0.8-1)
186257-35-2P,
Lithium magnesium zinc oxide (Li0-0.4Mg0.3-0.5Zn0.3-0.5O0.8-1)
RL: **CAT (Catalyst use)**; SPN (Synthetic preparation); PREP
(Preparation); USES (Uses)
(aerosol-based techniques for manuf. of perovskite-type
alkali-metal
modified zinc oxide catalysts)
IT 186299-23-0P, Cobalt copper potassium zirconium oxide
RL: **CAT (Catalyst use)**; SPN (Synthetic preparation); PREP
(Preparation); USES (Uses)
(aerosol-based techniques for manuf. of spinel-type **methanol**
-synthesis catalysts)
IT 12359-27-2P, Vanadyl phosphate ((VOPO4)
RL: **CAT (Catalyst use)**; SPN (Synthetic preparation); PREP
(Preparation); USES (Uses)
(aerosol-based techniques for manuf. of vanadium-phosphorus-type
oxidn.
catalysts)
IT 1317-60-8P, Hematite, uses
RL: **CAT (Catalyst use)**; SPN (Synthetic preparation); PREP
(Preparation); USES (Uses)
(aerosol; aerosol-based techniques for manuf. of **Fischer-**
Tropsch catalysts)
IT 7440-22-4P, Silver, uses
RL: **CAT (Catalyst use)**; SPN (Synthetic preparation); PREP
(Preparation); USES (Uses)
(alumina-supported; aerosol-based techniques for manuf. of
alumina-supported silver partial oxidn. catalysts)
IT 630-08-0, Carbon monoxide, reactions
RL: RCT (Reactant); RACT (Reactant or reagent)
(hydrogenation of; aerosol-based techniques for manuf. of
Fischer-Tropsch and **methanol** synthesis
catalysts)
IT 11104-44-2P, Bismuth molybdate
RL: **CAT (Catalyst use)**; SPN (Synthetic preparation); PREP
(Preparation); USES (Uses)
(partial oxidn. catalysts; aerosol-based techniques for manuf. of
bismuth molybdate-type partial oxidn. catalysts)
IT 109547-09-3P, Iron lanthanum strontium oxide (Fe(La,Sr)O3)
110758-99-1P,
Calcium iron lanthanum oxide ((Ca,La)FeO3)
RL: **CAT (Catalyst use)**; SPN (Synthetic preparation); PREP
(Preparation); USES (Uses)

(perovskite; aerosol-based techniques for manuf. of **Fischer-Tropsch** catalysts)
IT 125149-48-6P, Cerium strontium ytterbium oxide ((Ce,Yb)SrO2.5-3)
RL: **CAT (Catalyst use)**; SPN (Synthetic preparation); PREP (Preparation); USES (Uses)
(perovskite; aerosol-based techniques for manuf. of perovskite-type Sr-Ce-Yb oxide catalysts for methane oxidative coupling)
IT 7440-62-2P, Vanadium, uses
RL: **CAT (Catalyst use)**; SPN (Synthetic preparation); PREP (Preparation); USES (Uses)
(phosphorus-contg. catalysts; aerosol-based techniques for manuf. of
vanadium-phosphorus-type oxidn. catalysts)
IT 113924-15-5P, Chromium copper zinc oxide (Cr2(Cu,Zn)O4)
186257-33-0P,
Cesium chromium copper zinc oxide (Cs0-1Cr1-2Cu0.05Zn0.5O4)
RL: **CAT (Catalyst use)**; SPN (Synthetic preparation); PREP (Preparation); USES (Uses)
(spinel; aerosol-based techniques for manuf. of spinel-type **methanol**-synthesis catalysts)
IT 1344-28-1P, Aluminum oxide (Al2O3), uses
RL: **CAT (Catalyst use)**; SPN (Synthetic preparation); PREP (Preparation); USES (Uses)
(support; aerosol-based techniques for manuf. of alumina-supported silver partial oxidn. catalysts)
IT 7723-14-0P, Phosphorus, uses
RL: **CAT (Catalyst use)**; SPN (Synthetic preparation); PREP (Preparation); USES (Uses)
(vanadium-contg. catalysts; aerosol-based techniques for manuf. of vanadium-phosphorus-type oxidn. catalysts)

L53 ANSWER 20 OF 22 CAPLUS COPYRIGHT 2004 ACS on STN
1995:686849 Document No. 123:56833 Process for the production of **alcohols** and diols by hydrogenation. Scarlett, John (Eastman Chemical Company, USA). U.S. US 5395990 A 19950307, 14 pp.
(English).
CODEN: USXXAM. APPLICATION: US 1993-175542 19931230. PRIORITY: GB 1993-24753 19931202.
AB A process for the prodn. of a **alcs.** and diols by hydrogenation of a hydrogenatable material selected from monoesters of carboxylic
acids,
monoesters of dicarboxylic acids, diesters of dicarboxylic acids, aldehydes, olefinically unsatd. aldehydes, and mixts. of two or more thereof, comprises (a) providing a hydrogenation zone contg. a charge
of a

granular hydrogenation catalyst which has a total surface area of at
least
about 15 m2 /g, a **pore size** distribution such that
more than 50% of the **pore vol.** is provided by
pores in the **size** range less than about 40 nm, and a
surface area distribution such that more than 50% of the total surface
area is provided by **pores** in the **size** range of from
about 7 nm to about 40 nm; (b) supplying to the hydrogenation zone a
feed
stream of a mixt. contg. hydrogen and the hydrogenatable material; (c)
maintaining the hydrogenation zone under temp. and pressure conditions
which are conducive to effecting hydrogenation of the hydrogenatable
material; and (d) recovering a product stream comprising the hydroxy
compd. The process is exemplified by the hydrogenation of di-Me
1,4-cyclohexanedicarboxylate to yield 1,4-cyclohexanedimethanol.

IT **1314-13-2D**, Zinc oxide, reduced **7440-05-3**, Palladium,
uses
RL: **CAT (Catalyst use)**; USES (Uses)
(process for the prodn. of **alcs.** and diols by hydrogenation)

RN 1314-13-2 CAPLUS

CN Zinc oxide (ZnO) (9CI) (CA INDEX NAME)

O═Zn

RN 7440-05-3 CAPLUS

CN Palladium (8CI, 9CI) (CA INDEX NAME)

Pd

IC ICM C07C029-147
ICS C07C029-14; C07C027-04

NCL 568864000

CC 35-2 (Chemistry of Synthetic High Polymers)
Section cross-reference(s): 45

ST **alc** diol prepn hydrogenation; cyclohexanedimethanol prepn
hydrogenation; ester hydrogenation; lactone hydrogenation; aldehyde
hydrogenation

IT Hydrogenation
Hydrogenation catalysts
(process for the prodn. of **alcs.** and diols by hydrogenation)

IT **Alcohols**, preparation

Glycols, preparation
RL: IMF (Industrial manufacture); PREP (Preparation)
(process for the prodn. of **alcs.** and diols by hydrogenation)

IT Aldehydes, reactions
RL: RCT (Reactant); RACT (Reactant or reagent)
(process for the prodn. of **alcs.** and diols by hydrogenation)

IT Lactones
RL: RCT (Reactant); RACT (Reactant or reagent)
(process for the prodn. of **alcs.** and diols by hydrogenation)

IT Carboxylic acids, reactions
RL: RCT (Reactant); RACT (Reactant or reagent)
(esters, process for the prodn. of **alcs.** and diols by hydrogenation)

IT **1314-13-2D**, Zinc oxide, reduced 1344-70-3D, Copper oxide, reduced **7440-05-3**, Palladium, uses 11104-65-7D, Copper chromite, reduced
RL: **CAT (Catalyst use)**; USES (Uses)
(process for the prodn. of **alcs.** and diols by hydrogenation)

IT 105-08-8P, 1,4-Cyclohexanedimethanol
RL: IMF (Industrial manufacture); PREP (Preparation)
(process for the prodn. of **alcs.** and diols by hydrogenation)

IT 94-60-0, Dimethyl 1,4-cyclohexanedicarboxylate 96-48-0, γ-Butyrolactone 110-62-3, n-Valeraldehyde 123-72-8, n-Butyraldehyde 141-05-9, Diethyl maleate 502-44-3, ε-Caprolactone 624-48-6, Dimethyl maleate 645-62-5, 2-Ethyl-hexen-2-al 34880-43-8, 2-Propylhept-2-enal 37942-76-0
RL: RCT (Reactant); RACT (Reactant or reagent)
(process for the prodn. of **alcs.** and diols by hydrogenation)

L53 ANSWER 21 OF 22 CAPLUS COPYRIGHT 2004 ACS on STN
1993:237298 Document No. 118:237298 Catalytic **reforming** of toluene with carbon dioxide over rare earth oxide promoted palladium/γ-alumina catalysts. Pillai, S. Muthukumaru; Ohnishi, R.; Ichikawa, M. (Res. Cent., Indian Petrochem. Corp. Ltd., Baroda, 391 346, India). Reaction Kinetics and Catalysis Letters, 48(1), 247-54 (English) 1992. CODEN: RKCLAU. ISSN: 0304-4122.

AB On **Pd/γ- Al2O3** catalysts, PhMe undergoes **reforming** with CO_2 to give benzene and synthesis gas at 1 atm and 400-500°. Among the **promoters, Ce** oxide showed improved selectivity and activity, compared with other rare earth oxides.
Based on the catalytic runs and temp.-programmed reaction expts., the mechanism of the reaction was proposed.

CC 51-11 (Fossil Fuels, Derivatives, and Related Products)
Section cross-reference(s): 47

ST toluene oxidn benzene synthesis gas; partial oxidn toluene synthesis gas;
palladium toluene partial oxidn benzene; rare earth oxide toluene oxidn;
cerium oxide toluene partial oxidn; **reforming** toluene carbon dioxide palladium
IT Rare earth oxides
RL: **CAT (Catalyst use)**; USES (Uses)
(catalysts, contg. palladium, for **reforming** of toluene with carbon dioxide, to benzene and synthesis gas)
IT Fuel gas manufacturing
(synthesis gas, **reforming**, of toluene, with carbon dioxide, rare earth oxide-promoted palladium catalysts for)
IT 7440-19-9, Samarium, uses
RL: **CAT (Catalyst use)**; USES (Uses)
(catalysts, contg. palladium, for partial oxidn.-**reforming** of toluene with carbon dioxide, for manuf. of synthesis gas)
IT 7439-89-6, Iron, uses 7439-91-0, Lanthanum, uses 7440-45-1, Cerium,
uses 7440-48-4, Cobalt, uses 7440-62-2, Vanadium, uses 7440-65-5,
Yttrium, uses
RL: **CAT (Catalyst use)**; USES (Uses)
(catalysts, contg. palladium, for **reforming** of toluene with carbon dioxide, for manuf. of synthesis gas)
IT 7440-05-3, Palladium, uses
RL: **CAT (Catalyst use)**; USES (Uses)
(catalysts, rare earth oxide-promoted, for **reforming** of toluene with carbon dioxide)
IT 71-43-2P, Benzene, preparation
RL: FORM (Formation, nonpreparative); PREP (Preparation)
(formation of, in **reforming** of toluene with carbon dioxide, palladium-based catalysts for)
IT 108-88-3, Toluene, reactions
RL: RCT (Reactant); RACT (Reactant or reagent)
(**reforming** of, with carbon dioxide, for manuf. of synthesis gas, palladium catalysts for)
IT 124-38-9, Carbon dioxide, uses
RL: USES (Uses)
(toluene **reforming** with, for manuf. of synthesis gas, palladium catalysts for)

L53 ANSWER 22 OF 22 CAPLUS COPYRIGHT 2004 ACS on STN
1980:180613 Document No. 92:180613 Hydrogenation of crotonaldehyde in an aqueous solution of lithium hydroxide on mixed 1% **palladium-**

ruthenium/alumina catalysts. Tolstykh, E. V.; Kozina, S. M.; Sokol'skii, D. V. (USSR). Khimiya i Khimicheskaya Tekhnologiya (Alma-Ata, 1962-) 166-73 (Russian) 1978. CODEN: SSAKAG. ISSN: 0371-2842.

AB The title reaction initially gave PrCHO in 0.5-1 N LiOH and MeCH:CHCH2OH in 0.05-0.1 N LiOH. The final **BuOH** yield passed through a max. of 77.5% yield in 0.1 N LiOH over 1% 1:3 Pd-Ru/Al2O3.

IT **71-36-3P**, preparation
RL: SPN (Synthetic preparation); PREP (Preparation)
(prepn. of, by hydrogenation of crotonaldehyde, mechanism of catalytic)

RN 71-36-3 CAPLUS
CN 1-Butanol (9CI) (CA INDEX NAME)

$H_3C-CH_2-CH_2-CH_2-OH$

CC 23-7 (Aliphatic Compounds)

IT 7440-18-8, uses and miscellaneous
RL: **CAT (Catalyst use)**; USES (Uses)
(catalyst, with palladium, for hydrogenation of crotonaldehyde, effect of lithium hydroxide concn. of, on mechanism with)

IT 7440-05-3, uses and miscellaneous
RL: **CAT (Catalyst use)**; USES (Uses)
(catalyst, with ruthenium, for hydrogenation of crotonaldehyde, effect of lithium hydroxide concn. on mechanism with)

IT **71-36-3P**, preparation
RL: SPN (Synthetic preparation); PREP (Preparation)
(prepn. of, by hydrogenation of crotonaldehyde, mechanism of catalytic)

=> d l54 1-88 ti

L54 ANSWER 1 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN
TI Low-temperature combustion of CH4 over CeO2-MOx solid solution (M = Zr4+, La3+, Ca2+, or Mg2+) promoted Pd/γ-Al2O3 catalysts

L54 ANSWER 2 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN
TI Behavior of Fresh and Deactivated Combustion Promoter Additives

L54 ANSWER 3 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN
TI Method for preparation of ruthenium-alumina catalyst used in ammonia synthesis

L54 ANSWER 4 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN
TI Effects of promoters on the catalytic properties and surface characteristics of Ru-B/ZrO2 amorphous alloy catalysts

L54 ANSWER 5 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN
TI Effects of cerium oxide on the oxidation activity and thermal stability of Pd/Al2O3 catalysts

L54 ANSWER 6 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN
TI Influence of the nature of the Ce-promoter on the behavior of Pd and Pd-Cr TWC systems

L54 ANSWER 7 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN
TI Catalytic ceramic membrane in a three-phase reactor for the competitive hydrogenation-isomerization of methylenecyclohexane

L54 ANSWER 8 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN
TI Effects of Ni on the activity of Pd-La-Ce automotive exhaust catalysts

L54 ANSWER 9 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN
TI The thermal stability and catalytic performance of **Ce**-Zr **promoted** Rh-**Pd**/γ- **Al2O3** automotive catalysts

L54 ANSWER 10 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN
TI Catalytic performance of Pd/Al2O3 catalyst prepared by glow discharge plasma method for selective hydrogenation of acetylene

L54 ANSWER 11 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN
TI Metal-**promoter** interface in **Pd**/(**Ce**,Zr)Ox/ **Al2O3** catalysts: effect of thermal aging

L54 ANSWER 12 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN
TI Method and apparatus for exhaust gas treatment

L54 ANSWER 13 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN
TI Activity and stability of RuO2/γ-Al2O3 catalyst in wet air oxidation

L54 ANSWER 14 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN
TI Catalysts for cleaning of diesel engine exhaust gases

L54 ANSWER 15 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN
TI Oxidative decomposition of naphthalene by supported metal catalysts

L54 ANSWER 16 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN
TI Promoted nickel-magnesium oxide catalysts and process for producing synthesis gas

L54 ANSWER 17 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN
TI Promoted nickel-magnesium oxide catalysts for producing synthesis gas by
autothermal partial oxidation

L54 ANSWER 18 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN
TI Discovery of new paraffin isomerization catalysts based on SO42-/ZrO2 and
WOx/ZrO2 applying combinatorial techniques

L54 ANSWER 19 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN
TI Ceria and automotive catalyst

L54 ANSWER 20 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN
TI Combustion-deposited metal-metal oxide catalysts for short-contact-time
partial oxidation of methane to synthesis gas

L54 ANSWER 21 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN
TI Activity of Pd/Al2O3 and Ru/Al2O3 catalysts in the hydrogenation of o-xylene. Effect of thiophene

L54 ANSWER 22 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN
TI Preparation of Pd-Ce/ZrO2 catalysts for methane oxidation

L54 ANSWER 23 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN
TI Ceramic fiber filter having catalysts and promoters supported on coat layer

L54 ANSWER 24 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN
TI Ceramic body and ceramic catalyst body

L54 ANSWER 25 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN
TI Influence of thermal sintering on the activity for CO-O2 and CO-O2-NO

stoichiometric reactions over Pd/(Ce,Zr)Ox/Al2O3 catalysts

L54 ANSWER 26 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN
TI Photocatalytic interior wall sheets with good humidity controlling properties

L54 ANSWER 27 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN
TI Total oxidation of methane over palladium catalyst supported on modified alumina

L54 ANSWER 28 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN
TI Supported Pd catalysts for high-temperature methane combustion - examining the combustion synthesis preparation method

L54 ANSWER 29 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN
TI Catalyst-supported filter for purification of exhaust gas

L54 ANSWER 30 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN
TI Effects of Copper on the Catalytic Properties of Bimetallic Pd-Cu/(Ce,Zr)Ox/Al2O3 and Pd-Cu/(Ce,Zr)Ox Catalysts for CO and NO Elimination

L54 ANSWER 31 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN
TI Interior walls with photocatalytic materials also showing humidity-controlling properties and their manufacture

L54 ANSWER 32 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN
TI Pd-, Pt-, and Rh-Loaded Ce0.6Zr0.35Y0.05O2 Three-Way Catalysts: An Investigation on Performance and Redox Properties

L54 ANSWER 33 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN
TI Preparation of Ru Nanoparticles Supported on γ-Al2O3 and Its Novel Catalytic Activity for Ammonia Synthesis

L54 ANSWER 34 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN
TI Effect of Thermal Sintering on Light-Off Performance of Pd/(Ce,Zr)Ox/Al2O3 Three-Way Catalysts: Model Gas and Engine Tests

L54 ANSWER 35 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN
TI Study of CeO2-ZrO2 solid solution promoters modified by Nd

L54 ANSWER 36 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN

TI Preparation method study on Pd/Ce/Al/monolith honeycomb catalyst

L54 ANSWER 37 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN
TI Membrane-catalyst systems for selectivity improvement in dehydrogenation
and hydrogenation reactions

L54 ANSWER 38 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN
TI Conversion of ethane to ethylene and synthesis gas with cerium oxide.
Promoting effect of Pt, Rh and Ru

L54 ANSWER 39 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN
TI New Pd/CexZr1-xO2/Al2O3 three-way catalysts prepared by microemulsion.
Part 2. In situ analysis of CO oxidation and NO reduction under
stoichiometric CO + NO + O2

L54 ANSWER 40 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN
TI New Pd/CexZr1-xO2/Al2O3 three-way catalysts prepared by microemulsion.
Part 1. Characterization and catalytic behavior for CO oxidation

L54 ANSWER 41 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN
TI Effect of rare earth promoter on complete oxidation activity of Pd/Al2O3
catalyst for methane

L54 ANSWER 42 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN
TI A new approach of CeO2 and La2O3 effects on the three-way catalysts
containing low precious metals

L54 ANSWER 43 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN
TI Structure of Pd/CeOx/Al2O3 Catalysts for NOx Reduction Determined By in
Situ X-ray Absorption Spectroscopy

L54 ANSWER 44 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN
TI Correlation between basicity and the adsorption of NO on supported Pd
catalysts

L54 ANSWER 45 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN
TI Characterization of model automotive exhaust catalysts: Pd on Zr-rich
ceria-zirconia supports

L54 ANSWER 46 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN
TI Neural network modeling of transition metal-zeolite exhaust catalysts

L54 ANSWER 47 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN
TI Thermal aging of Pd/Pt/Rh automotive catalysts under a cycled oxidizing-reducing environment

L54 ANSWER 48 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN
TI Modifying catalytic properties of palladium by addition if rare earths (Ce, La): activity and catalytic selectivity in hydrocarbon conversion reactions

L54 ANSWER 49 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN
TI Effect of CuO on performance of precious metal/CeO2/Al2O3 monolith catalyst

L54 ANSWER 50 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN
TI Sealed solid electrolyte permselective gas sensors

L54 ANSWER 51 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN
TI Influence of Ceria on Pd Activity for the CO+O2 Reaction

L54 ANSWER 52 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN
TI New method of liquid phase hydrogenation by metallic catalysts

L54 ANSWER 53 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN
TI Characteristics of Pd catalysts for methane oxidation

L54 ANSWER 54 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN
TI Catalyst for treating exhaust gases from internal combustion engines

L54 ANSWER 55 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN
TI Modification by lanthanide (La, Ce) promotion of catalytic properties of

palladium: Characterization of the catalysts

L54 ANSWER 56 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN
TI Catalytic decomposition of CFCs

L54 ANSWER 57 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN
TI CO oxidation on Pd/CeO2-ZrO2 catalysts

L54 ANSWER 58 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN
TI The role of zirconium in novel three-way catalysts

L54 ANSWER 59 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN
TI Kinetics of wet oxidation of black liquor over a Pt-Pd-Ce/alumina catalyst

L54 ANSWER 60 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN
TI Alumina-Supported Noble Metal Catalysts for Destructive Oxidation of Organic Pollutants in Effluent from a Softwood Kraft Pulp Mill

L54 ANSWER 61 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN
TI Light-off performance over cobalt oxide- and ceria-promoted platinum and palladium catalysts

L54 ANSWER 62 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN
TI Low temperature catalytic activity of cobalt oxide and ceria promoted Pt and Pd: -influence of pretreatment and gas composition

L54 ANSWER 63 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN
TI Terbium and **cerium promotion** of NO decomposition and NO-CO reaction on Pd and Rh catalysts

L54 ANSWER 64 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN
TI Exhaust gas purification catalysts consisting of stainless steel honeycomb carriers with improved mechanical strength and manufacture of the catalysts

L54 ANSWER 65 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN
TI The effect of promoters on Pt/Al2O3 catalysts for the reduction of NO by C3H6 under lean-burn conditions

L54 ANSWER 66 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN
TI Predoped iron oxide dehydrogenation catalysts for styrene manufacture

L54 ANSWER 67 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN
TI Exhaust gas treatment catalyst complex containing mixed cerium and zirconium oxide promoter

L54 ANSWER 68 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN
TI Reduction of mixed alumina-supported Pt-Ru-Ce catalysts with hydrogen

L54 ANSWER 69 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN
TI Regeneration of dehydrogenation and dehydrocyclization catalysts by decoking with chlorine and molecular oxygen

L54 ANSWER 70 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN

TI Palladium alloy catalyst for thermal decomposition of NO

L54 ANSWER 71 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN
TI Catalysts for combustion of hydrocarbon oils

L54 ANSWER 72 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN
TI Magnesium oxide-lanthanum oxide-alumina non-spinel ternary metal oxides
for metals passivation and sulfur oxide control in petroleum catalytic cracking

L54 ANSWER 73 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN
TI Effect of cerium on performance and physicochemical properties of platinum-containing automotive emission control catalysts

L54 ANSWER 74 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN
TI Preparation and characterization of chlorine-free ruthenium catalysts and
the promoter effect in ammonia synthesis. 3. A magnesia-supported ruthenium catalyst

L54 ANSWER 75 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN
TI Preparation and characterization of chlorine-free ruthenium catalysts and
the promoter effect in ammonia synthesis. 2. A lanthanide oxide-promoted
ruthenium/alumina catalyst

L54 ANSWER 76 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN
TI Methane oxidation over alumina-supported noble metal catalysts with and
without cerium additives

L54 ANSWER 77 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN
TI Lanthanide nitrates as effective promoters of a ruthenium-alumina catalyst
for ammonia synthesis

L54 ANSWER 78 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN
TI New concept of promoter action in supported ruthenium catalyst for ammonia
synthesis

L54 ANSWER 79 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN
TI Characterization of palladium/γ-alumina catalysts containing ceria

L54 ANSWER 80 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN
TI Structural analysis of zinc oxide/zinc chromium oxide
($ZnCr_2O_4$)/palladium
catalyst

L54 ANSWER 81 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN
TI Oxidation state of cerium in cerium-based catalysts investigated by
spectroscopic probes

L54 ANSWER 82 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN
TI Effects of platinum, palladium, and ruthenium on the reducibility of
cerium (4+) ions in cerium-alumina catalysts and the reactivity of
oxygen
radicals

L54 ANSWER 83 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN
TI High-temperature catalyst compositions for internal combustion engines

L54 ANSWER 84 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN
TI Oxidation catalyst for turbine exhaust gas purging at high
temperature and
space velocity

L54 ANSWER 85 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN
TI Interaction of cerium oxide with noble metals

L54 ANSWER 86 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN
TI Mixed **palladium-ruthenium** and palladium-rhodium
catalyst on an **alumina** support for the hydrogenation of phenol

L54 ANSWER 87 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN
TI Catalytic compositions

L54 ANSWER 88 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN
TI Catalyst composition of copper oxide-iron oxide on alumina

=> d 154 4,5,6,11,16,58,79,87 cbib abs hitstr hitind

L54 ANSWER 4 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN
2004:273407 Document No. 140:259715 Effects of promoters on the
catalytic
properties and surface characteristics of Ru-B/ZrO_2 amorphous alloy

catalysts. Han, Min-le; Liu, Shou-chang; Yang, Xiao-di; Wang, Ke;
Qiao,
Yu-qin; Zhang, Shu-fang (Department of Chemistry, Zhengzhou
University,
Zhengzhou, 450052, Peop. Rep. China). Fenzi Cuihua, 18(1), 47-50
(Chinese) 2004. CODEN: FECUEN. ISSN: 1001-3555. Publisher: Kexue
Chubanshe.

AB On the basis of the measurement of activity and selectivity, the
effects
of Fe, Zn, La and **Ce promoters** on the catalytic
properties and surface character of **Ru**-B/**ZrO2**
amorphous alloy catalysts have been studied by means of BET surface
measurement, DSC and TPR etc. The results show that the **promoters**
can increase the activity and selectivity evidently, enhance thermal
stability of the amorphous alloy catalysts, influence on surface
properties and redn. behavior of the catalysts. It was found that
there
are metal state and **Ru**-B-O species for **Ru** as an active
component under the catalytic reaction conditions, which are relative
to
the activity and selectivity resp.

IT **7440-45-1, Cerium**, uses
RL: **CAT (Catalyst use)**; PRP (Properties); USES (Uses)
(effects of **promoters** on catalytic properties and surface
characteristics of **Ru**-B/**ZrO2** amorphous alloy
catalysts)

RN 7440-45-1 CAPLUS

CN Cerium (8CI, 9CI) (CA INDEX NAME)

Ce

CC 67-1 (Catalysis, Reaction Kinetics, and Inorganic Reaction Mechanisms)
Section cross-reference(s): 56, 66

IT Metallic glasses
Metals, uses
RL: **CAT (Catalyst use)**; PRP (Properties); USES (Uses)
(effects of promoters on catalytic properties and surface
characteristics of Ru-B/ZrO2 amorphous alloy catalysts)

IT 1314-23-4, Zirconia, uses 7439-89-6, Iron, uses 7439-91-0,
Lanthanum,
uses **7440-45-1, Cerium**, uses 7440-66-6, Zinc, uses
454251-87-7
RL: **CAT (Catalyst use)**; PRP (Properties); USES (Uses)

(effects of **promoters** on catalytic properties and surface characteristics of **Ru**-B/**ZrO2** amorphous alloy catalysts)

L54 ANSWER 5 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN
2004:195055 Document No. 140:274976 Effects of cerium oxide on the oxidation
activity and thermal stability of Pd/Al2O3 catalysts. He, Chong-Heng; Zhu, Ming; Jin, Guo-Lin; Xu, Pei-Ruo; Wang, Ren (Coll. Chem. Eng., East
China Univ. Sci. & Technol., Shanghai, 200237, Peop. Rep. China). Yingyong Huaxue, 21(2), 154-158 (Chinese) 2004. CODEN: YIHUED. ISSN: 1000-0518. Publisher: Kexue Chubanshe.

AB The effects of **cerium** oxide on the catalytic activity and thermal stability of **Pd/Al2O3** were investigated. **Cerium** oxide improved the performance of **Pd/ Al2O3** catalysts in removal of CO and C3H6 from simulated exhaust gas. **Cerium** oxide could widen the operation-window of oxidn. reaction under redn. conditions ($\lambda > 1$) due to its high oxygen storage-release capacity. Moreover, a great advantage of **cerium** oxide as a **promoter** is that it stabilizes the dispersion of **Pd** particles on the surface of **Al2O3** during the sintering process. It may be due to the interaction of **Pd** with **cerium** oxide to form a **Pd**.delta.+ species which are more stable than Pd0 at high temp.

CC 59-3 (Air Pollution and Industrial Hygiene)
Section cross-reference(s): 51, 67

IT 1306-38-3, Cerium oxide, uses 1344-28-1, Alumina, uses 7440-05-3, Palladium, uses
RL: **CAT (Catalyst use)**; USES (Uses)
(effects of cerium oxide on oxidn. activity and thermal stability of
Pd/Al2O3 catalysts)

L54 ANSWER 6 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN
2004:149523 Document No. 140:394580 Influence of the nature of the
Ce-promoter on the behavior of Pd and Pd-Cr TWC systems. Iglesias-Juez,
A.; Martinez-Arias, A.; Hungria, A. B.; Anderson, J. A.; Conesa, J. C.;
Soria, J.; Fernandez-Garcia, M. (CSIC, Instituto de Catalisis y Petroleoquimica, Madrid, 28049, Spain). Applied Catalysis, A: General,
259(2), 207-220 (English) 2004. CODEN: ACAGE4. ISSN: 0926-860X. Publisher: Elsevier Science B.V..

AB A series of monometallic **Pd** and bimetallic **Pd**-Cr catalysts supported on CeOx/**Al2O3** (CA) and (**Ce**, Zr)Ox/ **Al2O3** (CZA) materials have been characterized using a combination of x-ray diffraction (XRD), electron microscopy, and Raman spectroscopy, and ESR and in situ diffuse reflectance Fourier transform IR and x-ray near-edge structure spectroscopies were used to analyze the redox and chem. processes taking place under light-off conditions in a gaseous, stoichiometric mixt. contg. CO, NO, and O2. The catalytic behavior of these mono- and bimetallic systems was strongly affected by the nature of the **cerium**-contg. **promoter**. The **Pd**-ceria interface appeared significantly more active than **Pd**-ceria/ **zirconia** in both CO oxidn. and NO redn. processes under stoichiometric conditions. This factor seems to dominate the differential behavior of **Pd** monometallic systems. In the case of **Pd** -Cr bimetallic systems, an addnl. strong influence of the base metal on the oxidn. state of **Pd** appears of importance in explaining the catalytic behavior of the samples. For the CeOx/**Al2O3**-supported catalyst, the formation of **Pd**(0) at lower temps. leads to an initial enhancement in activity, while formation of a **Pd**-Cr alloy above 473 K suppressed full NO conversion at high temps. These effects were absent in the (**Ce**, Zr)Ox/**Al2O3**-supported system.

IT **1344-28-1**, Aluminum oxide (**Al2O3**), uses
RL: **CAT (Catalyst use)**; USES (Uses)
(catalyst support; influence of the nature of the **Ce** **promoter** on the behavior of **Pd** and **Pd**-Cr three-way exhaust gas catalyst systems)

RN 1344-28-1 CAPLUS

CN Aluminum oxide (Al2O3) (8CI, 9CI) (CA INDEX NAME)

*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***

CC 59-3 (Air Pollution and Industrial Hygiene)
Section cross-reference(s): 51, 67

IT **1344-28-1**, Aluminum oxide (**Al2O3**), uses
RL: **CAT (Catalyst use)**; USES (Uses)
(catalyst support; influence of the nature of the **Ce** **promoter** on the behavior of **Pd** and **Pd**-Cr three-way exhaust gas catalyst systems)

IT 7440-05-3, Palladium, uses 7440-47-3, Chromium, uses 53169-24-7, Cerium zirconium oxide (Ce0.5Zr0.5O2)
RL: **CAT (Catalyst use)**; USES (Uses)

(influence of the nature of the Ce promoter on the behavior of Pd and
Pd-Cr three-way exhaust gas catalyst systems)

L54 ANSWER 11 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN
2003:926567 Document No. 140:222067 Metal-**promoter** interface in **Pd**/(**Ce**,Zr)Ox/**Al2O3** catalysts: effect of thermal aging. Iglesias-Juez, A.; Martinez-Arias, A.; Fernandez-Garcia, M. (CSIC, Instituto de Catalisis y Petroleoquimica, Madrid, 28049, Spain).
Journal of Catalysis, 221(1), 148-161 (English) 2004. CODEN: JCTLA5.
ISSN: 0021-9517. Publisher: Elsevier Science.

AB The behavior of **Pd** three-way catalysts (TWCs) **promoted** with **Ce**-Zr mixed oxides and supported on **alumina**, which were subjected to thermal degrdn. treatments, has been examd. during light-off tests under stoichiometric CO + NO + O2. Attention was paid to the region of aging temp. 1273-1373 K, where phase segregation of the ceria-**zirconia promoter** occurs. Characterization of the samples was performed using x-ray diffraction and Raman spectroscopy. In situ XANES/DRIFTS studies of the **Pd** chem. state at the surface and in the bulk of the materials were conducted to det. the noble metal response to the gas atm. during light-off. ESR was used to analyze the **promoter** surface and to study the redox response of the materials in contact with the reactant gases. Thermal degrdn. appears to sinter both the noble metal and **promoter** components of the catalyst but also stabilizes oxidized **Pd** entities in contact with the **promoter** prior to the occurrence of the **Ce**-Zr phase segregation reaction. Addnl., it enriches the **promoter** surface in the lanthanide cation. The influence of these physicochem. phenomena on the catalytic properties of the **Pd**-based TWCs is discussed.

IT **1314-23-4**, Zirconium oxide (**ZrO2**), formation (nonpreparative)
RL: **CAT (Catalyst use)**; FMU (Formation, unclassified); FORM (Formation, nonpreparative); USES (Uses)
(mixed-oxide **promoter** formation from; thermal aging effect on metal-**promoter** interface in **Pd**/(**Ce**,Zr)Ox/ **Al2O3** three-way exhaust gas catalysts)

```
RN   1314-23-4  CAPLUS
CN   Zirconium oxide (ZrO2) (8CI, 9CI)  (CA INDEX NAME)


O══Zr══O

IT   1344-28-1, Alumina, uses 7440-05-3,
     Palladium, uses
     RL: CAT (Catalyst use); USES (Uses)
        (thermal aging effect on metal-promoter interface in
        Pd/(Ce,Zr)Ox/Al2O3 three-way exhaust gas
        catalysts)
RN   1344-28-1  CAPLUS
CN   Aluminum oxide (Al2O3) (8CI, 9CI)  (CA INDEX NAME)

*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***
RN   7440-05-3  CAPLUS
CN   Palladium (8CI, 9CI)  (CA INDEX NAME)


Pd

CC   59-3 (Air Pollution and Industrial Hygiene)
     Section cross-reference(s): 51, 67
ST   metal promoter interface palladium cerium
     zirconium oxide alumina catalyst; three way exhaust catalyst
     palladium cerium zirconium oxide alumina
IT   IR spectra
        (Fourier-transform, diffuse reflectance, of catalysts; thermal
aging
        effect on metal-promoter interface in Pd/(
        Ce,Zr)Ox/Al2O3 three-way exhaust gas catalysts)
IT   Oxidation catalysts
     Reduction catalysts
        (exhaust gas; thermal aging effect on metal-promoter
        interface in Pd/(Ce,Zr)Ox/Al2O3 three-way
        exhaust gas catalysts)
IT   ESR (electron spin resonance)
     Raman spectra
     Thermal aging
     X-ray diffraction
     XANES spectra
        (of catalysts; thermal aging effect on metal-promoter
```

interface in **Pd**/(**Ce**,Zr)Ox/**Al2O3** three-way
exhaust gas catalysts)
IT Catalysts
(three-way exhaust gas; thermal aging effect on metal-**promoter**
interface in **Pd**/(**Ce**,Zr)Ox/**Al2O3** three-way
exhaust gas catalysts)
IT Catalysts
(three-way, exhaust gas; thermal aging effect on metal-**promoter**
interface in **Pd**/(**Ce**,Zr)Ox/**Al2O3** three-way
exhaust gas catalysts)
IT Exhaust gas catalytic converters
(three-way; thermal aging effect on metal-**promoter** interface
in **Pd**/(**Ce**,Zr)Ox/**Al2O3** three-way exhaust
gas catalysts)
IT 1306-38-3, **Cerium** oxide (CeO2), formation (nonpreparative)
1314-23-4, Zirconium oxide (**ZrO2**), formation
(nonpreparative)
RL: **CAT (Catalyst use)**; FMU (Formation, unclassified); FORM
(Formation, nonpreparative); USES (Uses)
(mixed-oxide **promoter** formation from; thermal aging effect on
metal-**promoter** interface in **Pd**/(**Ce**,Zr)Ox/
Al2O3 three-way exhaust gas catalysts)
IT 65453-23-8, **Cerium** zirconium oxide
RL: **CAT (Catalyst use)**; USES (Uses)
(**promoter**; thermal aging effect on metal-**promoter**
interface in **Pd**/(**Ce**,Zr)Ox/**Al2O3** three-way
exhaust gas catalysts)
IT 630-08-0, Carbon monoxide, reactions 11104-93-1, Nitrogen oxide
(NOx),
reactions
RL: RCT (Reactant); REM (Removal or disposal); PROC (Process); RACT
(Reactant or reagent)
(removal of; thermal aging effect on metal-**promoter** interface
in **Pd**/(**Ce**,Zr)Ox/**Al2O3** three-way exhaust
gas catalysts)
IT **1344-28-1, Alumina,** uses **7440-05-3,**
Palladium, uses
RL: **CAT (Catalyst use)**; USES (Uses)
(thermal aging effect on metal-**promoter** interface in
Pd/(**Ce**,Zr)Ox/**Al2O3** three-way exhaust gas
catalysts)

L54 ANSWER 16 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN
2003:696827 Document No. 139:216770 Promoted nickel-magnesium oxide
catalysts and process for producing synthesis gas. Ramani, Sriram;

Allison, Joe D.; Minahan, David M.; Wright, Harold A. (Conoco Inc., USA).
PCT Int. Appl. WO 2003072492 A1 20030904, 37 pp. DESIGNATED STATES: W:
AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR,
CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID,
IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD,
MG, MK, MN, MW, MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SD, SE, SG, SK,
SL, TJ, TM, TN, TR, TT, TZ, UA, UG, UZ, VC, VN, YU, ZA, ZM, ZW, AM, AZ,
BY, KG, KZ, MD, RU, TJ, TM; RW: AT, BE, BF, BJ, CF, CG, CH, CI, CM, CY,
DE, DK, ES, FI, FR, GA, GB, GR, IE, IT, LU, MC, ML, MR, NE, NL, PT, SE,
SN, TD, TG, TR. (English). CODEN: PIXXD2. APPLICATION: WO 2003-US627
20030109. PRIORITY: US 2002-PV359258 20020222.

AB Synthesis gas (CO/H) is produced by passing a mixt. of light hydrocarbons contg. 50 vol.% of methane and oxygen over a catalyst while maintaining autothermal catalytic partial oxidn. **promoting** conditions. The catalyst consists of a nickel-magnesium oxide solid soln. and at least one **promoter**, such as Cr, Mn, Mo, W, Sn, Re, Rh, **Ru**, Ir, Pt, La, **Ce**, Sm, Yb, Lu, Bi, Sb, In, P, or their oxides carried on a refractory support. The support can be **zirconia**, magnesia stabilized **zirconia**, **zirconia** stabilized **alumina**, yttrium stabilized **zirconia**, calcium stabilized **zirconia**, **alumina**, cordierite, mullite, titania, silica, magnesia, niobia, vanadia, nitrides, or carbides. The catalyst is prepd. by impregnating a support with a MgO precursor which is decompd. by thermal treatment to obtain a MgO impregnated support, followed by impregnation of the product with a nickel or nickel oxide precursor which is thermally treated to obtain a Ni and/or nickel oxide, MgO contg. intermediate, followed by impregnation with a **promotor** precursor, thermal treatment, and optional redn. of the catalyst. The partial oxidn. process is carried out at 200-10,000 kPa and 600-1,600 whereby the gas is passed over the catalyst at a gas hourly space velocity

of 100,000,000/h with a catalyst residence time of 10 ms. A
combustible
gas is added to the reaction mixt. sufficient to initiate a net
catalytic
partial oxidn. reaction. The reaction mixt. is preheated to 30-750.

IT **1314-23-4**, Zirconia, uses **1314-23-4D**, Zirconia,
magnesia, Y, Ca-stabilized **1344-28-1**, Alumina, uses
1344-28-1D, Alumina, zirconia-stabilized
RL: **CAT (Catalyst use)**; USES (Uses)
(catalyst support; promoted nickel-magnesium oxide catalysts for
producing synthesis gas by autothermal partial oxidn.)

RN 1314-23-4 CAPLUS
CN Zirconium oxide (ZrO_2) (8CI, 9CI) (CA INDEX NAME)

O=Zr=O

RN 1314-23-4 CAPLUS
CN Zirconium oxide (ZrO_2) (8CI, 9CI) (CA INDEX NAME)

O=Zr=O

RN 1344-28-1 CAPLUS
CN Aluminum oxide (Al_2O_3) (8CI, 9CI) (CA INDEX NAME)

*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***

RN 1344-28-1 CAPLUS
CN Aluminum oxide (Al_2O_3) (8CI, 9CI) (CA INDEX NAME)

*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***

IT **7440-18-8**, Ruthenium, uses **7440-45-1**, **Cerium**,
uses
RL: **CAT (Catalyst use)**; USES (Uses)
(**promoter; promoted** nickel-magnesium oxide
catalysts for producing synthesis gas by autothermal partial
oxidn.)

RN 7440-18-8 CAPLUS
CN Ruthenium (8CI, 9CI) (CA INDEX NAME)

Ru

RN 7440-45-1 CAPLUS
CN Cerium (8CI, 9CI) (CA INDEX NAME)

Ce

IC ICM C01B003-26
ICS B01J023-755
CC 51-11 (Fossil Fuels, Derivatives, and Related Products)
Section cross-reference(s): 67
IT Carbides
Nitrides
RL: **CAT (Catalyst use)**; USES (Uses)
(catalyst support; promoted nickel-magnesium oxide catalysts for producing synthesis gas by autothermal partial oxidn.)
IT 1302-88-1, Cordierite 1302-93-8, Mullite 1313-96-8, Niobia **1314-23-4**, Zirconia, uses **1314-23-4D**, Zirconia, magnesia, Y, Ca-stabilized 1314-62-1, Vanadia, uses **1344-28-1**, Alumina, uses **1344-28-1D**, Alumina, zirconia-stabilized 7631-86-9, Silica, uses 13463-67-7, Titania, uses
RL: **CAT (Catalyst use)**; USES (Uses)
(catalyst support; promoted nickel-magnesium oxide catalysts for producing synthesis gas by autothermal partial oxidn.)
IT 7440-65-5D, Yttrium, zirconia stabilized with 7440-70-2D, Calcium, zirconia stabilized with
RL: **CAT (Catalyst use)**; MOA (Modifier or additive use); USES (Uses)
(catalyst support; promoted nickel-magnesium oxide catalysts for producing synthesis gas by autothermal partial oxidn.)
IT 1309-48-4, Magnesium oxide (MgO), uses 1313-99-1, Nickel oxide, uses 7440-02-0, Nickel, uses
RL: **CAT (Catalyst use)**; USES (Uses)
(promoted nickel-magnesium oxide catalysts for producing synthesis gas by autothermal partial oxidn.)
IT 74-82-8, Methane, reactions 142-72-3, Magnesium acetate 373-02-4, Nickel acetate 7782-44-7, Oxygen, reactions 10099-59-9, Lanthanum nitrate 10103-47-6, Chromium nitrate 10377-60-3, Magnesium nitrate 10377-66-9, Manganese nitrate 13138-45-9, Nickel nitrate 17309-53-4, **Cerium** nitrate 20634-12-2, Platinum(2+), tetraammine-, dinitrate
RL: RCT (Reactant); RACT (Reactant or reagent)
(**promoted** nickel-magnesium oxide catalysts for producing

synthesis gas by autothermal partial oxidn.)
IT 7439-88-5, Iridium, uses 7439-91-0, Lanthanum, uses 7439-94-3, Lutetium, uses 7439-96-5, Manganese, uses 7439-98-7, Molybdenum, uses 7440-06-4, Platinum, uses 7440-15-5, Rhenium, uses 7440-16-6, Rhodium, uses **7440-18-8**, Ruthenium, uses 7440-19-9, Samarium, uses 7440-31-5, Tin, uses 7440-33-7, Tungsten, uses 7440-36-0, Antimony, uses **7440-45-1, Cerium**, uses 7440-47-3, Chromium, uses 7440-64-4, Ytterbium, uses 7440-69-9, Bismuth, uses 7440-74-6, Indium, uses 7723-14-0, Phosphorus, uses
RL: **CAT (Catalyst use)**; USES (Uses)
(**promoter; promoted** nickel-magnesium oxide catalysts for producing synthesis gas by autothermal partial oxidn.)

L54 ANSWER 58 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN
1998:539531 Document No. 129:206394 The role of zirconium in novel three-way catalysts. Mussmann, L.; Lindner, D.; Lox, E. S.; Van Yperen, R.; Kreuzer, T. P.; Mitsushima, I.; Taniguchi, S.; Garr, G. (Degussa AG, Germany). Society of Automotive Engineers, [Special Publication] SP, SP-1288(Zirconium in Emission Control), 57-68 (English) 1997. CODEN: SAESA2. ISSN: 0099-5908. Publisher: Society of Automotive Engineers.
AB Zirconium dioxide (**zirconia**) is a well-known material often being a major component in the washcoat systems of three-way catalysts (TWC) and diesel oxidn. catalysts. One important characteristic of **zirconia** contg. washcoats is an improved aging stability which is required to meet the more and more stringent emission stds. In the last few years the utilization of **zirconia** became even more important - esp. for high sophisticated three-way washcoat systems. This was due to the development of high temp. stable oxygen storage components, contg. **cerium** dioxide (ceria) in combination with different other oxides - one very promising candidate being **zirconia**. In the present work the results of a research program are discussed, focusing on the influence of **zirconia** in combination with ceria and addnl. rare earth **promoters** on the stability of the oxygen storage characteristics. The performance of these materials was tested in powder expts. as well as in completely formulated **Pd**-contg. TWC. Special emphasis is put on a new developed dynamic oxygen storage model

gas test, on activity tests in a model gas and on real engine evaluation
for the most promising systems. In summary the best catalyst performance
could be achieved with **zirconia** rich and ceria poor oxygen
storage components in combination with small amts. of extra stabilizers.
These new developed **zirconia** rich materials enhance
significantly the stability of the oxygen storage component per mass unit
ceria. By this, the amt. of expensive ceria in the washcoat could be
decreased dramatically upon maintaining improved activity of **Pd**
-based catalysts, even after high temp. engine aging.

CC 59-3 (Air Pollution and Industrial Hygiene)
Section cross-reference(s): 67

IT 1306-38-3, Ceria, uses 1314-23-4, Zirconia, uses 7440-05-3, Palladium,
uses
RL: **CAT (Catalyst use)**; USES (Uses)
(role of zirconium in novel three-way catalysts)

L54 ANSWER 79 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN

1988:616809 Document No. 109:216809 Characterization of palladium/γ-alumina catalysts containing ceria. Shyu, J. Z.; Otto, K.; Watkins, W. L.
H.; Graham, G. W.; Belitz, R. K.; Gandhi, H. S. (Res. Staff, Ford Mot.
Co., Dearborn, MI, 48121, USA). Journal of Catalysis, 114(1), 23-33
(English) 1988. CODEN: JCTLA5. ISSN: 0021-9517.

AB The effects of adding CeO_2 to Pd/Al_2O_3 as a catalyst modifier were
investigated by XPS and x-ray diffraction. Catalytic effects were
demonstrated by using propane oxidn. as a model reaction. CeO_2 promotes
oxidn. of Pd to PdO both with and without Al_2O_3. High-temp. redn.
(.simeq.920°) and the presence of Pd are required for the total
conversion to bulk $CeAlO_3$ from CeO_2/Al_2O_3. Pd also assists in the oxidn.
of bulk $CeAlO_3$ to CeO_2 at elevated temps. In ambient air, Pd facilitates
surface oxidn. of $CeAlO_3$ to CeO_2, whereas surface Pd acquires an oxidn.
state between Pd and PdO. On Pd/Al_2O_3 the propane oxidn. rate is lowered
by CeO_2 if the O concn. exceeds that of the stoichiometric ratio.

CC 67-1 (Catalysis, Reaction Kinetics, and Inorganic Reaction Mechanisms)
Section cross-reference(s): 59

IT 7440-05-3, Palladium, uses and miscellaneous
RL: **CAT (Catalyst use)**; USES (Uses)
(catalysts from alumina and, effect of ceria promoter on activity and
structure of)
IT 1306-38-3, **Cerium** dioxide, uses and miscellaneous
RL: USES (Uses)
(**promoter**, for **palladium-alumina**
catalysts, activity and structure in relation to)

L54 ANSWER 87 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN
1974:442056 Document No. 81:42056 Catalytic compositions. Hindin, Saul G.;
Dettling, Joseph C. (Engelhard Minerals and Chemicals Corp.). Ger. Offen.
DE 2339512 19740221, 22 pp. (German). CODEN: GWXXBX. APPLICATION: DE
1973-2339512 19730803.

AB Catalysts for the afterburning of combustion gases, that consist of a Pt group metal and Cu, Cr, and a rare metal as **promoters** and are active and stable at high temps., are described. The catalysts may be prepd. by impregnating activated **Al2O3** pellets with solns. of Cu(CH3COO)2, H2CrO4, **Ce**(NO3)3 and **Pd**(NO3)2, then drying at 100° and igniting at 1000°. In a variant procedure, the soln. contg. the **promoters** was mixed with powd. **Al2O3** and pellets shaped by extrusion. The pellets were then dried at 80° and ignited 2 hr at 1000°; after being impregnated with **Pd**(NO3)2 soln. they were calcined once more 2 hr at 500°. The finished catalyst contained 0.02 **Pd**, 1.2 CuO, 4.1 Cr2O3, 4.7 CeO2 and 90 wt. % **Al2O3**.

IC B01J; F01N; C07B
CC 67-1 (Catalysis and Reaction Kinetics)
Section cross-reference(s): 59
IT 1306-38-3 1308-38-9, uses and miscellaneous 1317-38-0, uses and miscellaneous 7440-05-3, uses and miscellaneous
RL: **CAT (Catalyst use)**; USES (Uses)
(catalyst, for oxidn. of exhaust gases)